Inconsistencies between promise and performance of policy designs for pollinator restoration

WP4: ENABLING CONDITIONS FOR LONG-TERM POLLINATOR RESTORATION AND LIVING LABS

TASK 4.2: DETERMINE INCONSISTENCIES BETWEEN PROMISE AND PERFORMANCE OF POLICY DESIGNS FOR POLLINATOR RESTORATION

Deliverable D4.2

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RestPoll

Restoring Pollinator habitats across European agricultural landscapes based on multi-actor participatory approaches

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List of Abbreviations

CAP	Common Agricultural Policy
EU-PI	EU Pollinators Initiative
EU	European Union
ESS	Ecosystem services
GBF	Global Biodiversity Framework
CBD	Convention on Biological Diversity
FAO	Food and Agriculture Organisation of the United Nations
IPI	FAO's International Pollinator Initiative
ELC	European Landscape Convention
EPI	European Pollinator Initiative
LL	Living Labs
NRL	Nature Restoration Law
CL	EU Climate Law
GDPR	General Data Protection Regulation
F2F	Farm to Fork
EC	European Commission
PFAS	Polyfluoroalkyl substances
SFDR	Sustainable Finance Disclosure Regulation
SACs	Special Areas of Conservation
HBD	Habitats and Birds Directive
SPAs	Special Protection Areas
AECMs	Agri-Environment-Climate Measures
EUPoMS	EU Pollinator Monitoring Scheme
SMRs	Statutory Management Requirements
GAECs	Good Agricultural and Environmental Conditions
MSs	Member States
HNV	High-Nature-Value
NPIs	Non-Productive-Investments
RED	Renewable Energy Directive
ILUC	Indirect Land Use Change

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Executive summary

The report is part of the RestPoll project, that addresses the urgent need to reverse pollinator decline across Europe. With pollinators essential for biodiversity, food security, and ecosystems, we examine the effectiveness and coherence of European policies amidst growing pressures such as habitat loss, climate change, and pesticide use.

The report aims to assess and compare European and global policies affecting pollinator health, restoration, and ecosystem services. Its objectives include identifying policy objectives, measures and instruments that harm pollinators, highlighting best practices, and evaluating policy coherence across sectors such as agriculture, environment, climate, and energy. By consulting 44 pollinator experts through a survey and a follow-up workshop, the report seeks to uncover gaps, synergies, and trade-offs within existing policy frameworks (Green Deal; Farm to Fork strategy; Nature Restoration Law; Chemicals Strategy for sustainability; Sustainable Finance Disclosure Regulation; Habitats and Birds directive; Landscape Convention; Climate Law; CAP: Conditionality; CAP: Eco-schemes; CAP: AECM; Soil Strategy for 2030; European Pollinator initiative; Biodiversity strategy for 2030; Renewable Energy Directive; Solar strategy).

The analysis is based on a five-step approach. First, eight environmental factors are identified (four direct drivers: Land cover and configuration, Land cover management, Presence and movement of honeybees, Pesticides and agrochemicals; and four instruments: Economic support for pollinator protection, Knowledge availability and use, Monitoring programmes, and Regulation). These are selected as critical factors influencing pollinator health and provide a basis for identification of relevant policies. Second, 19 key EU policies were scoped and assessed for their direct and indirect impacts on pollinator conservation. Third, an online survey among 44 pollinator experts from 21 countries across Europe gathered evaluations of policy synergies, trade-offs, and gaps, offering insights into their strengths and weaknesses. Fourth, initial survey results were analysed using descriptive statistics. Finally, an expert workshop facilitated in-depth discussions on barriers to achieving policy objectives and explored strategies for enhancing policy coherence and pollinator protection. This multi-step approach integrates expert insights in a cross-sectoral analysis to provide a robust evaluation of the alignment and effectiveness of European policies on pollinators.

The report reveals policy gaps and conflicts, particularly between agricultural and environmental objectives, which limit the effectiveness of measures such as habitat restoration and pesticide reduction. The report considers differences across northwestern, central and southern Europe in terms of environmental conditions, policy uptake, and funding, which further complicate EU-level policy implementation, requiring tailored approaches. Voluntary initiatives like eco-schemes and agri-environmental measures lack long-term impact due to their short-term and non-mandatory nature. Additionally, insufficient monitoring data hampers effective planning and evaluation of conservation efforts. Experts emphasise the need for improved policy coherence,

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targeted incentives, and cross-sector integration to address pollinator decline and ensure ecosystem resilience.

The report concludes that while European policies, such as the CAP and Biodiversity Strategy, recognise the importance of pollinator conservation, their implementation is hindered by gaps in coherence, enforcement, and monitoring. Experts identified habitat restoration, pesticide reduction, and improved cross-sector integration as critical priorities. Enhanced policy coherence, targeted funding, and robust monitoring are essential to address these challenges. Aligning European policies with global biodiversity targets is crucial for reversing pollinator declines and securing resilient ecosystems and pollination services for future generations.

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Introduction

The overall ambition of the RestPoll project is to substantially and permanently restore more habitats and enhance connectivity of wild pollinator habitats in Europe, by strengthening society-wide capability to reverse wild pollinator decline and stabilise pollination services and their societal benefits.

Within this overall frame, the specific objective of Task 4.2 has been to assess and compare European policies (e.g., strategic plans of the Common Agricultural Policy (CAP), Biodiversity 2030 strategy, EU Pollinators Initiative (EU-PI)) and those beyond the European Union (EU) (incl. US, China) with direct and indirect effects on pollinator restoration, and identify both i) incentives that result in activity which is harmful to pollinators and ii) best practices on management of pollinators. The current report presents the output of this work and is based on an assessment of existing European and global policies in a policy coherence analysis. The analysis is based on a consultation with 44 European pollinator experts assessing the coherence of existing pollinator conservation efforts, including perspectives for improving conditions for pollinator conservation in the future policy initiatives.

Further, pollinators and pollination services across Europe and beyond are under significant pressure with potentially serious consequences for biodiversity, food production, and ecosystem functioning (Dicks et al., 2021). Across the world, biodiversity is declining at an unprecedented rate, and the pressures driving this decline are intensifying (GBO, 2020), resulting in diverse negative impacts on ecosystem services (ESS). These include declines in pollinator habitat and maintenance, reduced pollination and dispersal of seeds, weakened regulation of pests, limited capacity in extreme weather mitigation, worsened air quality, depletion of genetic resources, and reduced nutrient cycling (Díaz et al., 2019; Rodger et al., 2021; Wagner, Grames, Forister, Berenbaum, & Stopak, 2021).

Around 75% of crop species and 35% of global crop production rely directly on insect-pollination (Klein et al., 2007), with insect decline having substantial negative yield consequences on some of the agricultural production (Lippert, Feuerbacher, & Narjes, 2021; Raven & Wagner, 2021; Zattara & Aizen, 2021). Several interconnected pressures have caused the pollinator decline including habitat loss and fragmentation due to changes in land use, intensity of pesticide use, climate change effects, spread of invasive species, diseases and parasites (GBO, 2020; IPBES, 2017). In light of these challenges, it is pertinent to consider whether the polices and policy instruments that support pollinators are sufficiently effective (Bemelmans-Videc, Rist, & Vedung, 2011) in conserving pollinators and pollination services across Europe.

ENVIRONMENTAL GOVERNANCE

Aiming at fostering effective environmental governance, a key challenge is that the policy development and implementation through different policy instruments is segmented into distinct sectors, such as agriculture, industry, transport, and energy (Nilsson et al., 2012),

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as well as levels of governance from strategic planning to management. Additionally, individual ministries, agencies and organisations tend to pursue narrowly defined sectoral objectives with little consideration for their overall environmental impact (Carter, 2018). Further, where multiple actors participate in policy making at various levels (supranational, national, and sub-national), geographical separation may also prevent the realisation of policy objectives (Stephenson, 2013).

This fragmentation of responsibility and actions can pose a hindrance to overall sustainable development because addressing environmental concerns needs to be integrated in the formulation of policies and objectives also across sectors. Thus, achieving sustainable environmental outcomes on the ground presupposes careful planning and policy design to ensure a balancing of the interdependencies of political, social, and economic factors, ensuring that the policy that is pursued on an overall level simultaneously reflects social, economic, and environmental sustainability. The analytical approach that we have adopted in the paper is outlined in more detail in Chapter 2.

ENVIRONMENTAL POLICIES IN EUROPE

Over the past 30 years, the EU's environmental policies have evolved significantly, shifting from a focus on pollution control and nature conservation to a broader sustainability agenda and market liberalisation (Thorsøe et al., 2020). The 1990s saw the introduction of the Habitats Directive and the expansion of regulations on air and water quality (Nitrate Directive, and later the Water Framework Directive). More recently, with initiatives like the European Green Deal, the EU has intensified efforts to address climate change, aiming for carbon neutrality by 2050 and promoting circular economy and biodiversity conservation. The Common Agricultural Policy (CAP) has been a cornerstone throughout the period, where the focus has shifted from a system of production-based subsidies to one prioritising environmental sustainability and rural development (Hasler et al., 2022). The 1992 MacSharry reforms marked a significant shift by reducing direct production support and introducing direct payments and later decoupled activity-based payments for eco-system services (greening) (Daugbjerg & Swinbank, 2008).

Today a set of key international conservation policies guide the delivery of eco-system services in Europe, including:

1) **Globally**, the *Kunming-Montreal Global Biodiversity Framework* (GBF), adopted in December 2022 as an outcome of the *Convention on Biological Diversity (CBD),* is an important backdrop for subsequent European environmental policy development. The international agreement aims at halting and reversing biodiversity loss by 2030 and has established 23 targets and 4 overarching goals, focusing on ensuring the protection of 30% of the planet's land and oceans, restoring degraded ecosystems, reducing pollution, and ensuring sustainable use of biodiversity. Further, the use of pesticides and nutrients should be reduced by 50% by 2030. With respect to pollinators, most notably Target 7 focuses on reducing the negative impacts of pollution, such as pesticides, which are harmful to pollinators. Additionally, Target 10 emphasises sustainable agricultural practices that enhance

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biodiversity, including measures that directly benefit pollinators by improving habitat availability and reducing habitat fragmentation. Likewise, pollinator restoration is covered also by GBF Target 2 on restoration of degraded ecosystems, and Target 3 on protecting areas of high biodiversity. In addition to GBF, mention can be made also of the *FAO's International Pollinator Initiative (IPI)* and its action plan for 2018-2030, which aims to aims to improve the management of pollination services in agriculture by promoting practices that enhance pollinator habitats, improve pollinator health, and raise awareness about pollination's role in food security.

2) **Within Europe**, the *Habitats Directive* of 1992 aims to protect Europe's most vulnerable habitats and species through the creation of a network of protected areas (Natura 2000). This directive focuses on conserving over 1,000 species and 200 types of habitats that are considered of EU-wide importance. Although few species of bees and butterflies are included in the directive, several habitat types of relevance for pollinators are protected under the directive supporting more species. In 2000, the *European Landscape Convention* (ELC) was adopted, being the first international treaty exclusively focused on the protection, management, and planning of all landscapes in Europe. Further, with respect to chemicals, the EU's Pesticide Directive regulates the use of pesticides, aiming to protect human health and the environment by ensuring that pesticides are safe and effective. As a result, in 2018, a ban was imposed on the outdoor use of three neonicotinoid pesticides due to evidence of their harmful effects on pollinators, particularly bees. More recently, the *European Pollinator Initiative* (EPI) introduced in 2018 aims at addressing the decline of pollinators by promoting conservation, research and knowledge sharing, as well as policy actions to protect pollinators and their habitats. The *European Green Deal* introduced in 2019 aims to address biodiversity loss and environmental degradation in a broader sense, beyond the protected Nature 2000 areas. In support of the Green Deal, the *Biodiversity Strategy for 2030* focuses on restoring ecosystems, halting biodiversity loss, and protecting 30% of the EU's land and sea areas.

Despite these efforts, the European Court of Auditors in their 2020 assessment of the European Commission's initiatives for wild pollinators concluded that hitherto these have had little effect on halting the decline of wild pollinators (ECA, 2020). In their revision of the Pollinator Initiative, the commission stress the current incoherence of policies and the need to close the gaps in key EU sectoral policies tackling pollinator decline (EC, 2023). Further, the EPI and the Biodiversity Strategy are said to suffer from insufficient management to achieve their objectives, while the biodiversity and agricultural policies, and the pesticides legislation are deemed inadequate in terms of measures for the protection of wild pollinators.

Although policy goals in Europe are ambitious, critics also argue that the Green Deal has too strong a focus on carbon emissions reduction, while overshadowing other urgent environmental issues like biodiversity loss and ecosystem restoration (Omar & Thorsøe, 2024). Given the upcoming negotiations regarding adjustments to the CAP 2028-2034, the present RestPoll study will feed into a discussion about how to further improve

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conditions for pollinators (incl. pollinator diversity, abundance, and health) in Europe and ensure that European policies are aligned with objectives in international agreements like the Kunming-Montreal GBF.

Against this background, **the objective of this report is to assess the European policies with direct and indirect effects on pollinator health, pollinator habitats, and the resulting delivery of ecosystem services.** The remainder of this report is structured as follows:

- Chapter 2 presents the methodology that was used in data gathering and in the compilation of results, including the scope and environmental factors used in the analysis;
- Chapter 3 presents the scoping of European policies across four policy siloes (Agrifood, Environment, Climate and Energy) of European policies of relevance to pollinator health and the outcome of the survey and workshop with key European pollinator and pollination experts on the coherence of current policies;
- Chapter 4 discusses the findings in relation to the Environmental indicators
- Chapter 5 summarises the conclusions of the analysis and provides perspectives on the coherence of EU pollinator policies based on examples from countries outside the EU.

Supplementary material is provided in the form of four appendices that present the 1) guidelines used for policy scoping, 2) the survey questionnaire, 3) the workshop templates and transcript of the inputs provided, and 4) lists of contacts included in the survey and workshops.

Methodology

This chapter describes the methodological considerations and choices with respect to the framework adopted in the report studying policy coherence.

ANALYSING POLICY COHERENCE

In this report, the policy coherence analysis is carried out based on frameworks outlined in (Nilsson et al., 2012; OECD, 2021). Policy coherence analysis is designed for the assessment and mitigation of environmental risks by identifying and addressing potential harms (in our case pollinators), ensuring more resilient and adaptive policies. Therefore, the policy coherence analysis, which assesses whether various policies work together, providing a comprehensive framework for assessing the systemic interactions between different areas of policy making. Although also relevant as an input to policy design, the focus of policy coherence falls within the realm of "governance"(i.e. administration, policy outputs, and implementation of policy instruments) (OECD, 2021).

Policymaking follows an iterative process often illustrated as the policy cycle in five steps (Carter, 2018); Bemelmans-Videc et al., 2011): 1) agenda setting, where issues are identified; 2) policy formulation, where solutions are developed; 3) decision-making, where a course of action is chosen; 4) implementation, where the policy is enacted; and 5) evaluation, where its effectiveness is assessed. In terms of the policy process, this

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analysis addresses the implementation and evaluation stages of the policy cycle, respectively.

In recent years, analysing the coherence of the policies within a particular area has gained traction as a lens for observing how distinctly separated policy arenas interact and may constitute a barrier or an opportunity for achieving broader environmental outcomes. The framework has, thus, been applied at both national and European scales (OECD, 2023) to study distinctly different aspects such as climate policy (Evans, Duwe, & Velten, 2023), land-use (Eberl, Gordeeva, & Weber, 2021), and energy (Häbel & Hakala, 2021). However, so far, no policy coherence analysis has been carried out on European biodiversity and pollinator policies. A commonality across these different policy areas is the wicked nature of the challenges that are discussed and the fact that these often transgress traditional silos of policymaking. This results in a need for an interdisciplinary approach as each of these fields cannot be addressed by one discipline alone (Alrøe & Noe, 2014). Further, within particular areas such as land use, policy coherence is particularly important, since its base (different land covers) is limited and needs to fulfil many different functions simultaneously (Eberl et al., 2021; Himes, Betts, Messier, & Seymour, 2022). With respect to policy making in the EU, this is particularly relevant given the fragmented and multi-level nature of the governance system, which makes it vulnerable to incoherence (Lenschow, Bocquillon, & Carafa, 2018), both within and among units of governance (Lazdinis, Angelstam, & Pülzl, 2019).

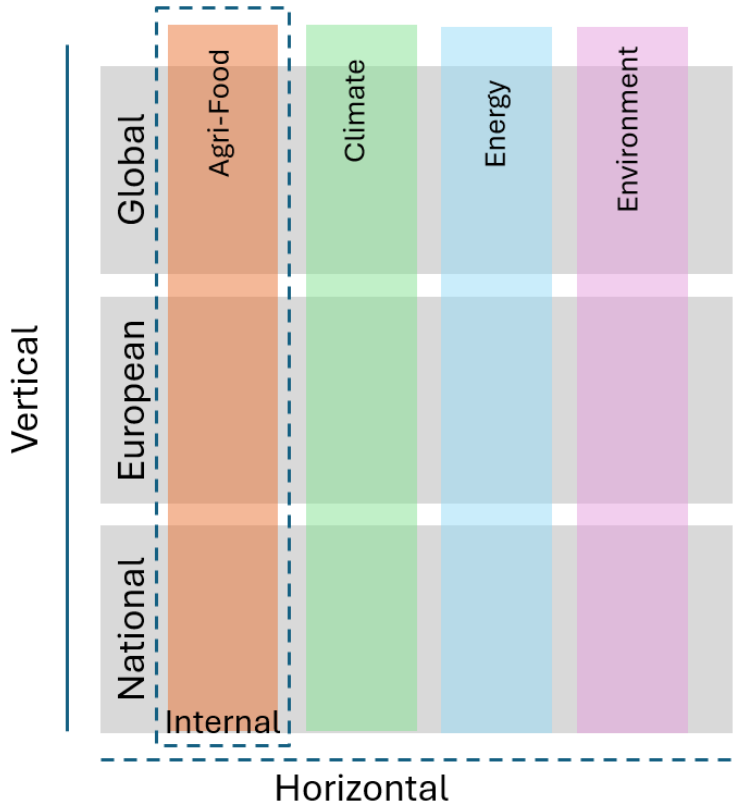

Figure 1: Dimensions of policy coherence, based on (Evans et al., 2023; Nilsson et al., 2012).

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Research further distinguishes between different dimensions of policy coherence – horizontal, vertical, and internal (see Figure 1). The horizontal dimension refers to the alignment of policy objectives and outcomes across particular policy domains. The vertical policy coherence refers to alignment between different levels of governance, e.g., Member State and EU policy. Finally, the internal policy coherence takes one policy field and looks at whether the policies and objectives within it are mutually compatible (integrated), considering interactions between these (Evans et al., 2023).

In this analysis, we focused on EU level policies, considering primarily at the horizontal and integrative dimensions of the framework with regard to synergies, trade-offs, and opportunities for improving considerations for pollinators, but also to a lesser extent taking the vertical dimension into account due to the multi-level dynamic of this policy arena (top-down). This provides a general overview of the EU policies in place for pollinator restoration, while also considering the interactions between this and related policy arenas. In a second step, T4.3, a more detailed analysis will engage a series of pollinator restoration Living Labs (LLs) of the RestPoll project as well as a group of external pollinator experts for a more in-depth analysis of the policies as they are experienced at the local level by stakeholders (bottom-up). The results of this second step will be presented as RestPoll D4.3.

WORKFLOW AND DATA TREATMENT

Our analysis was carried out in five steps (see Figure 2), with the background for each of these further elaborated below.

Step 1: Delineation of the study scope and identification of environmental factors

Before the initiation of the evaluation of policies with direct and indirect effects on pollinators, the scope of the study had to be defined. The study has been delineated based on the objectives of the RestPoll project that focus on the conservation of both wild and managed pollinators as both groups feature across the RestPoll case study and LL sites. The focus of the present analysis was to consider the coherence of policies that influence pollinator health, pollinator habitats, and pollination services. We consider trade-offs, synergies, and gaps within and between four related policy siloes, i.e. 1) Agriculture, 2) Climate, 3) Environment, and 4) Energy.

For the policy coherence analysis relevant environmental factors were needed to analyse specifically how policies influence the conditions for pollinators. By considering their potential environmental impacts, policies can be designed in a way to prevent, or at least not aggravate, long-term ecological degradation and resource depletion. Environmental factors also ensures that we can compare policy objectives and measures and assess their alignment with the needs of pollinators. These environmental factors helped us trace how diverse policies can potentially impact different elements of pollinator health, habitats, and services.

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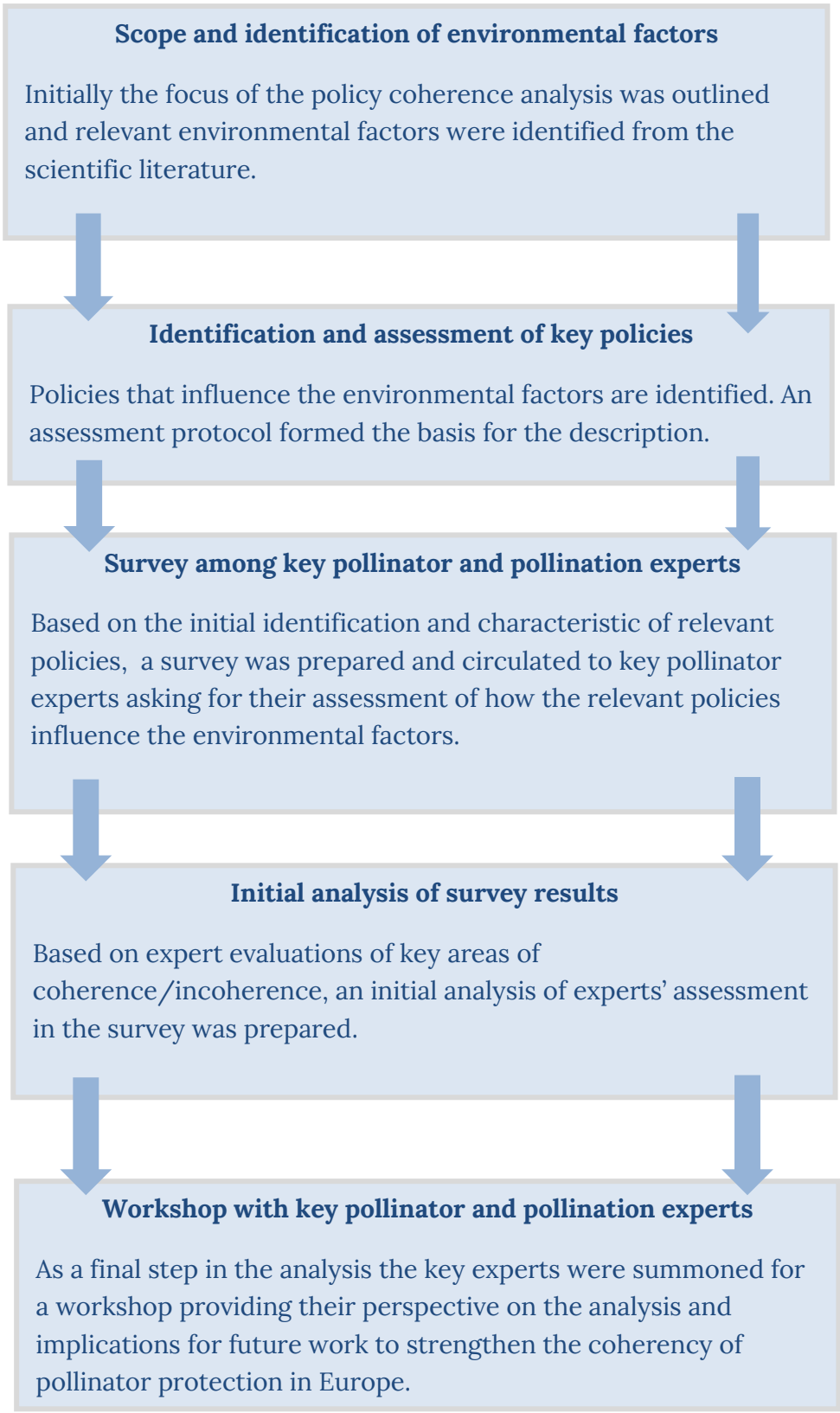

Figure 2: Workflow of the assessment of the coherence of pollinator restoration policies.

Specific environmental factors (external forces that shape decision-making and behaviour of land users, including both social and natural aspects) were chosen to align with the scope of the analysis as outlined above, taking two important considerations into

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account. First, the selected factors should inform about key pressures on pollinators based on a review of the state-of-the-art scientific literature. Secondly, indicators should be sensitive to changes in policy to be suitable for informing about the ability of policies to address challenges for pollinators. To this end, the IPBES assessment of Pollinators, Pollination and Food Production provided a good basis for our initial selection of environmental factors (Dicks et al., 2021; IPBES, 2017), although we exclude direct drivers that are only marginally influenced by policy in a short-term perspective (climate change, pests and pathogens, and invasive alien species) as well as GMO crops, which are banned from cultivation in the EU.

In line with Stout and Dicks (2022), we also supplemented the list of environmental factors with specific **incentives** that describe mechanisms that policymakers use to influence behaviour and outcomes in a specific direction. For this we selected three specific factors relating to how behaviour is influenced by policy making based on (Bemelmans-Videc et al., 2011) and (Carter, 2018): 1) regulatory incentives that work by establishing rules and penalties that encourage compliance and discourage undesirable actions, promoting desired outcomes through enforcement; 2) market-based incentives that work by aligning individual goals with financial rewards or penalties, encouraging actions that maximise profit or minimise costs; and 3) knowledge and information that work by shaping perceptions, guiding decisions, and empowering individuals to make informed choices based on available data or knowledge. Further, monitoring was added since insufficient monitoring data is an important barrier for informed policy decisions (IPBES, 2017).

Based on these considerations, we selected eight factors (incl. four direct drivers and four incentives) that influence the health, habitats, and services of pollinators: 1) Land cover and configuration, 2) Land cover management, 3) Presence and movement of honeybees, 4) Pesticides and agrochemicals, as well as 5) Economic support for pollinator protection, 6) Knowledge availability and use, 7) Monitoring programmes, and 8) Regulation. Table 1 presents the factors used in the analysis along with a description of how they relate to the objective of promoting pollinator health, habitats, and services. Taken together the factors provide a comprehensive view of the conditions for pollinator health, habitats, and services as well as the instruments used to change land users' behaviour.

As a baseline year, the analysis is focused on 2024, which marks an important point in time, since a number of key policies in support of the European Green Deal have been agreed or adopted. Therefore, much of the architecture of the current pollinator conservation efforts is currently in place, although for some policies there is limited experience with implementation. Given the broad nature of the inquiry and our qualitative approach to analysis, we have not sought to quantify the specific impact of policies on the factors, rather, the factors were used to provide a basis for a comparison.

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Table 1: Environmental factors used as a basis for assessment of EU policies to promote pollinator health, habitats, and services.

	Environmental factor	Influence on pollinators
Direct drivers	Land cover and configuration	Focuses on the physical characteristics of the land surface determining the availability and connectivity of habitats, which provide essential resources for pollinators.
	Land cover management	Focuses on human activities (how land is used) determining the quantity and quality of habitats available to pollinators for sourcing food (nectar and pollen) and providing nesting sites. Influenced by practices such as mowing, overgrazing, monocropping, etc.
	Presence and movement of honeybees	Introduces/spreads diseases, competition for floral resources, or genetic mixing, impacting wild pollinator populations and ecosystem dynamics.
	Pesticides and agrochemicals	By improper or excessive use can harm or kill pollinators, while by responsible application helps minimise their exposure to harmful substances, supporting pollinator health.
Incentives	Economic support for pollinator protection	Encourages farmers, businesses, and communities to adopt pollinator-friendly practices, supporting (1) the conservation and sustainability of vital pollinator populations, and (2) sustaining an attractive landscape for nature-based tourism.
	Knowledge availability and use	Enables stakeholders to implement evidence-based conservation practices, reducing threats and promoting pollinator health and biodiversity.
	Monitoring programmes	Provide crucial data on pollinator population trends, species diversity, and environmental threats, enabling timely conservation actions and informed policy decisions.
	Regulation	Promote or restrict certain behaviour.

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Step 2: Identification and assessment of key policies

EU policies often overlap in multiple sectors, so it is crucial to identify the most relevant policies to ensure the analysis targets significant areas of interaction and potential conflict or synergy. In this phase of the analysis, key EU policies were identified and scoped to assess if they potentially have a direct or indirect influence on pollinator health. Policies were selected in a dialogue between pollinator experts from the RestPoll project, with additional input from the project's steering group that also includes EU-level policymakers.

In the selection of the 19 policies for the analysis, we adopted a structured approach to ensure that the most relevant and impactful ones were included. Taking the selected environmental factors into account, we distinguish further between three EU policy levels by including examples from each. First, we addressed the overarching policies, which are high-level frameworks that provide strategic orientation and set priorities spanning across multiple sectors, often influencing a wide range of specific sectors, such as, for instance, the European Green Deal and more specifically the Farm2Fork strategy that outlines Green Deal priorities. Secondly, we look into the sector-specific policies that are closely related to a specific area of policymaking, including the CAP and the EU-PI. Lastly, we cover cross-cutting policies that deal with issues that span across different domains and therefore affect multiple sectors, but are more action oriented than overarching policies, including the Nature Restoration Law (NRL), the EU Climate Law (CL) as well as specific actions in pursuit of these.

Further, we have selected policies that have cross-sectoral implications or large-scale effects (e.g., European Green Deal, CAP) as well as policies where policy incoherence is most likely (for instance, those aimed at increasing agricultural productivity vs. reducing chemical inputs). To ensure comparability in the characterisation of the most important policies, we have followed a joint template in our description of the most important policy areas (see Appendix A). The focus of this part of the analysis was to identify key strategic objectives, measures (specific actions or interventions designed to achieve a policy goal) and instruments (broader mechanisms or tools used by governments to influence behaviour) that influence the eight environmental factors (incl. direct drivers and incentives) as selected above. This, however, was not an option for some policies that were not yet fully implemented or designed as broader strategies. This initial scoping part was implemented as a descriptive exercise, in which we sought to clarify if policies directly or indirectly influenced environmental factors or if such impact was not specified in the policy.

The initial characterisation of policies was carried out using the Modified Delphi approach (Dicks et al., 2021). A modified Delphi method differs from a normal Delphi method by incorporating pre-existing data in the initial rounds, streamlining the process by focusing on refining expert consensus rather than generating ideas. This approach was selected as the complexity of the European policy architecture is challenging to

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comprehend and the drivers that impact pollinators across Europe are similarly complex. Further, the Modified Delphi approach is a preferred option when resources for implementing a traditional Delphi approach are scarce and when the assessment can be based on pre-existing research. Hence, the initial characterisation and assessment of each policy was carried out in a dialogue among designated pairs of RestPoll partners, following a draft description prepared by one partner. The protocol for the screening of policies and identification of objectives, measures and instruments is available as Appendix A.

Step 3: Survey among key pollinator/pollination experts

To assess the implications of policies on pollinator health, habitats and ESS, we conducted an expert survey with 75 key pollinator/pollination experts (19 from RestPoll, 56 external experts). Detailed guidelines for the survey can be found in Appendix B. Engaging experts ensures that the coherence analysis is both credible and grounded in real-world knowledge. The survey aimed to evaluate the importance of interactions and alignment across policy silos, considering both synergies and conflicts. This approach is critical for understanding the effectiveness of policies and improving their integration.

The decision to base the survey on insights from pollinator/pollination experts was intentional. These experts possess a deep understanding of both the policy landscape and the measures needed to improve conditions for pollinators. Their technical knowledge, which may not be accessible to the general public or policymakers, provides valuable nuances that help refine policy implementation. Additionally, the expert survey serves as a means to verify if any important topics were overlooked in the initial assessment.

Experts were first selected from the RestPoll LL coordinators, who have a solid understanding of the foundation for pollinator restoration through their involvement in the RestPoll project. Beyond the RestPoll consortium, we also recruited researchers with prior experience in cross-European research on pollinators and effects of various measures introduced to. As the authors to this report are actively engaged in several significant European pollinator projects, formal and informal networks built through these initiatives played a key role in expert recruitment. An additional effort was made to achieve a balanced representation of experts from across Europe, as well as ensure a good gender balance among those (see Figure 3). A list of experts involved in the survey is provided in Appendix C.

Based on the initial characterisation of policies outlined in Step 1, we developed a brief expert survey focused on two key themes:

1. **Section 1:** Assess the impact of overarching European policy objectives on pollinators.
2. **Section 2:** Evaluate specific policy measures.

The survey included a General Data Protection Regulation (GDPR) statement from the European Commission, followed by multiple-choice questions and a final open-ended

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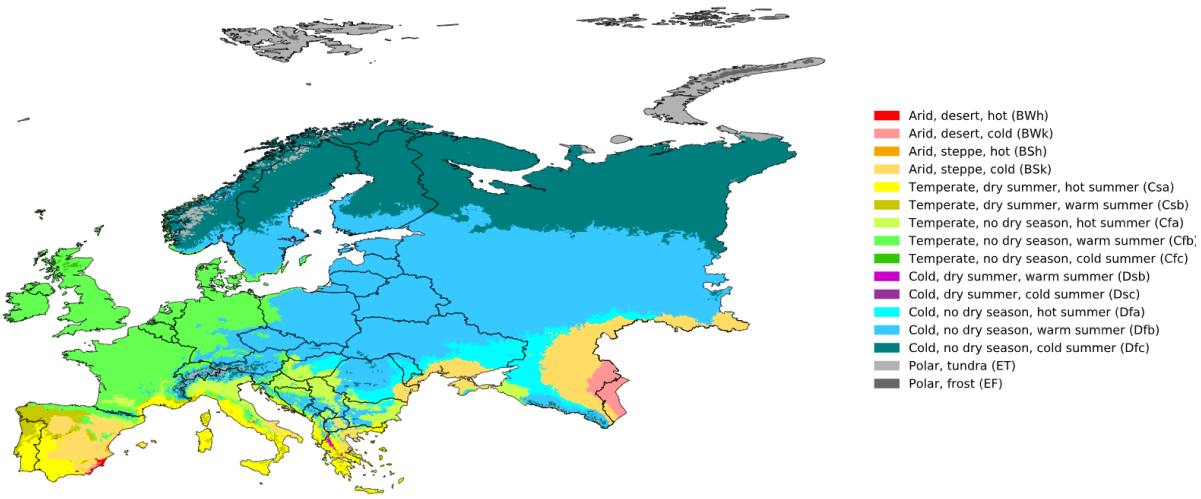

Figure 3: Köppen–Geiger climate classification for Europe in 1991-2020 applied for the classification of countries in the survey and workshop (Beck et al., 2023).

question for additional comments or reflections. The survey was organised into four sections (Appendix B):

1. Background Information
2. Synergies with Strategic Objectives
3. Synergies with Instruments and Measures
4. Overall Assessment

Each section was introduced with an explanatory note. The questions were designed with the expectation that respondents would not have in-depth knowledge of every European policy. . Additionally, the survey included an "Other" option, allowing respondents to highlight and score any relevant elements not covered by the questions. All questions were formatted using a Likert scale (1-5), with an “I don’t know” option, though responses marked “I don’t know” were excluded from data analysis. Further, for each question respondents were asked to self-report the level of certainty they associated with the assessment they provided.

Experts from all participating countries were surveyed online via the web-based SurveyXact platform. The survey was run in November 2024, with two reminder emails sent to encourage participation.

Survey requests were sent to a total of 75 contacts, and 44 surveys were completed representing 21 countries, which were categorised into three European regions based on their Köppen–Geiger climate classification (Cole et al., 2022; Figure 3). Participants were primarily male (n=29), and the southern region had the lowest rate of female participation; female participants (n=15) were most prominent in the central (37.5%) and northwest (26.6%) regions (Figure 4). The overall average years of experience working with pollinators and/or biodiversity was 20.5 years, with a range of 1 to 50 (Figure 5).

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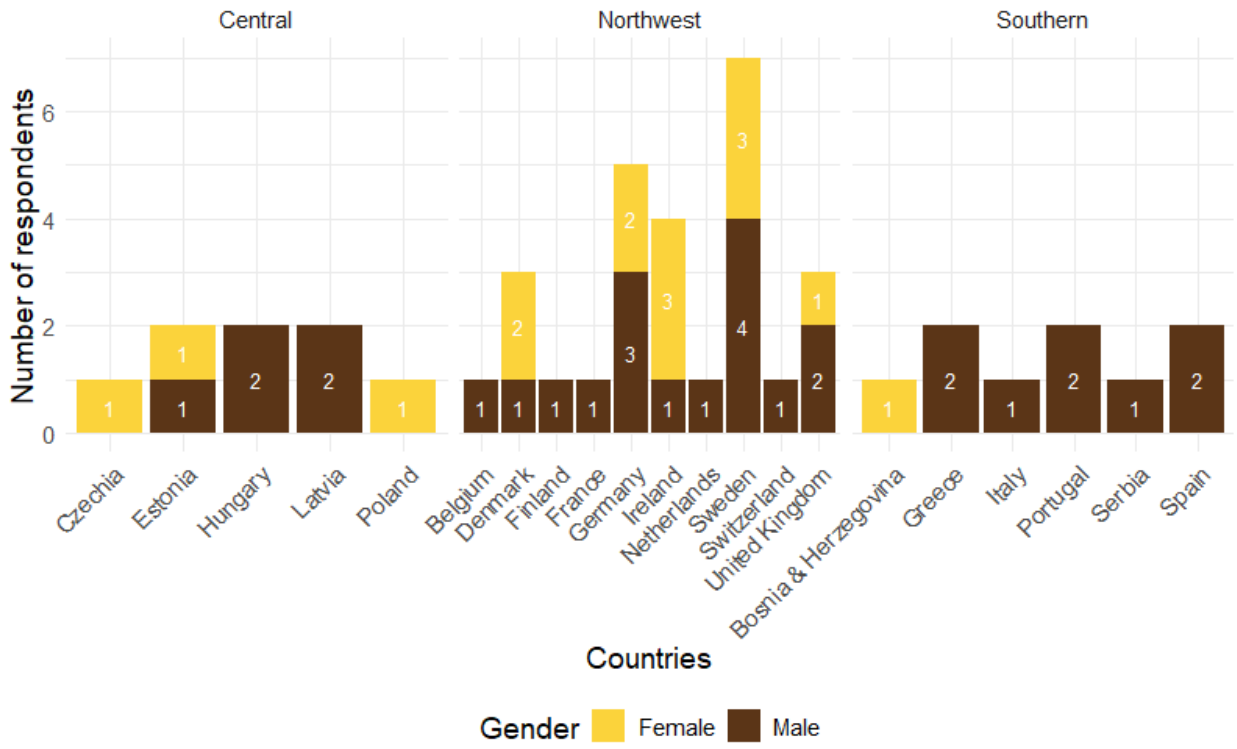

Figure 4. Number and reported gender of survey respondents by country and European region.

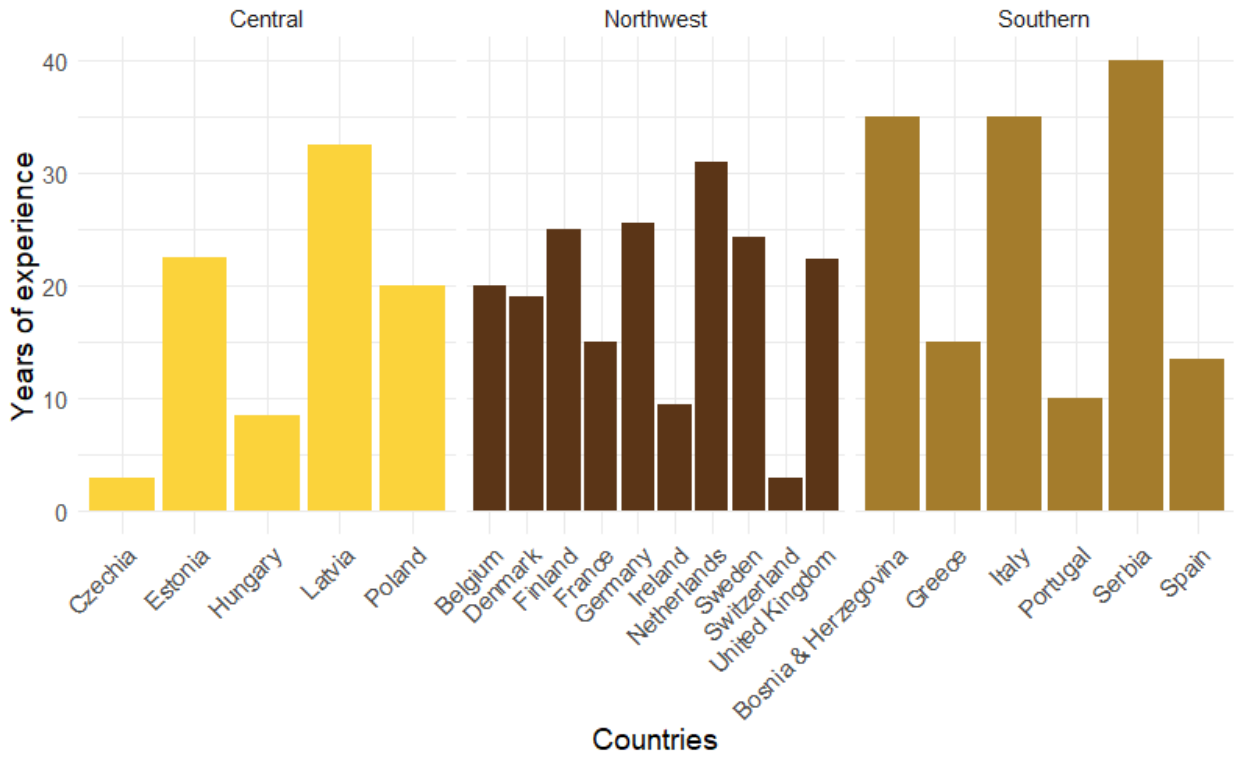

Figure 5. Average years of experience working with pollinators and/or biodiversity by country and European region.

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Step 4: Initial analysis of survey results

The results were analysed in preparation for the expert workshop. The data included both qualitative and quantitative elements. Quantitative data were presented using descriptive statistics, avoiding advanced statistical models due to varying response rates across countries, which could obscure differences in the data, see chapter 3.2. For questions on the influence of strategic objectives and measures on pollinator conservation, we calculated a weighted mean, considering the number of respondents per country. All Likert scale responses were analysed in this way, with results presented in heatmaps categorised by country.

While statistical comparisons can provide valuable insights, conducting such analyses in our case is not appropriate due to the limited number of participants and the inherent variability in environmental conditions across regions. The small sample size significantly reduces statistical power, increasing the likelihood of drawing unreliable or non-representative conclusions. Additionally, the differing environmental contexts, such as climate, land use, and biodiversity, introduce confounding factors that cannot be adequately controlled or accounted for with the available data. As a result, statistical comparisons could misrepresent expert perspectives and potentially lead to flawed interpretations or recommendations. Instead, qualitative synthesis or descriptive analysis is more suitable for capturing the diversity of expert insights and the nuanced effects of policies on pollinators in different contexts.

Qualitative responses from the "Other" option in each survey question were reviewed to identify recurring themes and broaden the perspectives derived from the closed-ended questions.

Step 5: Workshop with key pollinator/pollination experts

To deepen our understanding of European policies' impact on pollinator health, we organised a follow-up online workshop to discuss the survey results and explore potential strategies for improving EU policy coherence and enhancing pollinator protection. A total number of 24 experts from 14 European countries took part in the workshop, with a good gender balance among the participants but dominated by experts from the northwest region (see Table 2). A detailed description of the workshop format can be found in Appendix B.

After a brief introduction to the survey results, participants engaged in a Miro board exercise designed to identify barriers to achieving the EU's strategic objectives, as well as measures and instruments for pollinator conservation. The group was divided into three regional clusters: Northwest, Central, and South, reflecting different climate zones in Europe. The discussions took place in two breakout sessions:

1. **First Breakout Session:**

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- Explored how to improve coherence for each strategic objective based on survey results;
- Discussed what is needed to strengthen pollinator protection at the European level.

2. **Second Breakout Session:**

   - Explored how coherence can be enhanced for specific policy measures based on the survey results;
   - Identify actions required to further strengthen pollinator protection across Europe.

The workshop was held on November 29th, 2024**, results from the workshop are presented in chapter 3.3.**

Table 2: Distribution of the workshop participants by European region, country and gender.

European region	Country	Male	Female	Total number of participants
Central	Estonia		1	1
	Latvia		1	1
	Czech Republic		1	1
Northwest	Denmark	2	1	3
	France	1		1
	Germany	2	2	4
	Ireland		2	2
	Sweden	2	2	4
	United Kingdom	1	1	2
	Belgium	1		1
Southern	Italy		1	1
	Spain	1		1
	Bosnia and Herzegovina		1	1
	Cyprus	1		1
	TOTAL	**11**	**13**	**24**

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Results

The chapter is structured in three sections. Initially we outline the outcome of the scoping of policies at the three levels - overarching, cross-sectoral, and sectoral. Afterwards, we present the results from the survey of pollinator experts, and finally the outcomes of the workshop with key pollinator experts are presented.

SCOPING OF EUROPEAN POLICIES

Across Europe, 19 key policies were identified and screened for content (see Figure 6), covering topics broadly across the agri-food, climate, environment, and energy sectors. The three sections below present the content of each of these policy areas. In the end, we summarise the main conclusions from the policies, in the form of a list of some of the key objectives, measures, and instruments.

OVERARCHING POLICY FRAMEWORKS

In terms of overarching policy frameworks in the EU, the Green Deal and the Farm to Fork Strategy are important for pollinators as they set long-term goals for sustainable agriculture and environmental protection. By fostering a systemic shift in farming, these frameworks aim to secure the health of pollinators, vital for food security and biodiversity. In the following, these frameworks are further detailed.

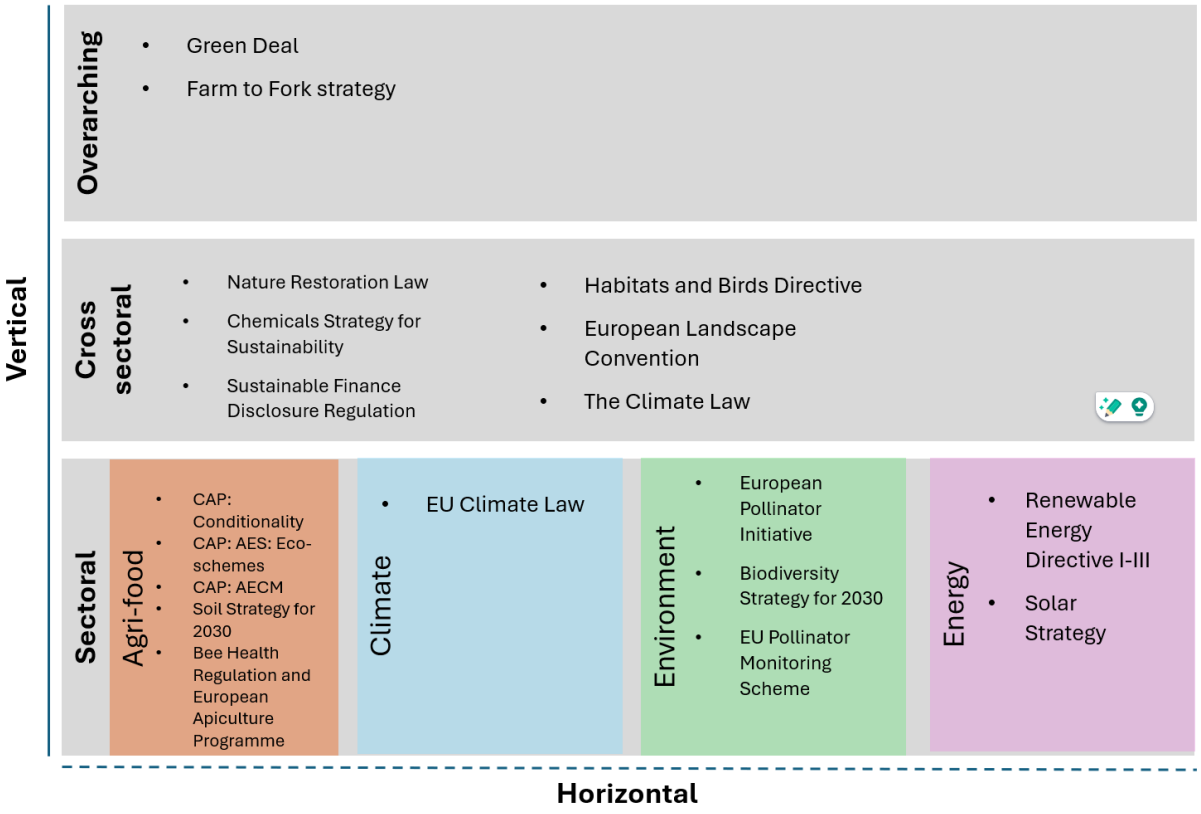

Figure 6: EU policies included in the screening of policies.

The European Green Deal

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The European Green Deal is an overarching policy initiative aiming to make Europe climate-neutral by 2050 through sustainable practices, reduced emissions, and environmental protection (EC, 2019a). Within the European Green Deal climate change and environmental degradation are seen as an existential threat to Europe and the world. To overcome these challenges, the European Green Deal is positioned as a growth strategy that protects the climate and aims to transform the EU into a modern, resource-efficient and competitive economy, ensuring: (a) no net emissions of greenhouse gases by 2050, (b) economic growth decoupled from resource use, (c) no person and no place left behind. The overarching objective of the Green Deal is for Europe to become the first climate-neutral continent in the world. With the framework first presented in the end of 2019, many regulations and directives are proposed, revised or enacted, addressing several different perspectives of the climate neutrality effort.

The European Green Deal covers all sectors of the economy, notably transport, energy, agriculture, buildings, and industries such as steel, cement, ICT, textiles and chemicals (EC, 2019a). As such it provides a package of proposals and measures targeting climate and biodiversity, energy and transport legislation. It provides a reference point for such documents as the European Climate Law, the Biodiversity Strategy for 2030, the new Industrial Strategy and Circular Economy Action Plan, the Farm to Fork Strategy for sustainable food, and proposals for pollution-free Europe (Zero Pollution Action Plan for Water, Air and Soil). The communication on the Green Deal itself does not stipulate specific actions or make explicit references to pollinators, but it pertains to a range of further regulations that directly or indirectly touch upon them, a number of these detailed further below.

The Farm to Fork (F2F) Strategy

The Farm to Fork (F2F) strategy, launched in 2020 by the European Commission, builds on the European Green Deal by promoting sustainable food systems, reducing the environmental impact of farming, and ensuring food security through eco-friendly practices, including reducing pesticide use and supporting biodiversity (EC, 2020b). The framework aims to make the EU's food systems more sustainable while ensuring food security, public health protection, and environmental resilience. As a core part of the European Green Deal, it sets ambitious targets to transform each stage of the food chain—from production to consumption—with a focus on environmental, economic, and social sustainability. Overall, the F2F strategy seeks to make the EU's food systems resilient by balancing the needs of food security and environmental sustainability. It calls for engagement from all actors in the food chain to achieve these goals by 2030.

The main actions pursued as a part of the F2F strategy promote sustainability across the food chain, from production to consumption, involving regulatory frameworks, incentives, and support for innovation. A core goal is to reduce the use of chemicals: The EU aims to cut pesticide use and risk by 50% and fertilizer use by 20% by 2030. This also includes fostering organic farming and agroecology, with a target of 25% of agricultural

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land under organic production. Additionally, the strategy promotes local food systems and short supply chains to reduce emissions linked to transportation and boost local food resilience.

The strategy further advocates healthy diets by supporting public awareness about plant-rich and nutrient-dense foods, helping reduce diet-related health issues. Efforts also focus on reducing food waste, with binding targets for waste reduction across the food chain and promoting food donation, recycling, and waste-to-energy processes. To lower emissions across the food chain, the strategy supports practices that reduce greenhouse gases, such as carbon capture and methane reduction, and encourages improved energy efficiency. Research and innovation are essential, with investments directed towards developing sustainable production technologies and effective monitoring of environmental impacts.

Transparency is another priority, with proposed product labelling that informs consumers about the environmental impacts of their food choices encouraging responsible consumption. Efforts to protect biodiversity and ecosystem resilience include initiatives to maintain natural habitats, create ecological corridors, and support pollinators critical to agriculture.

Finally, the strategy emphasises a regulatory framework and financial incentives to support these shifts, including subsidies, financial aid, and tax policies favouring sustainable practices. Special attention is given to supporting small-scale farmers in the transition.

By combining sustainable agricultural practices, reduced chemical inputs, local food support, waste reduction, emissions management, and robust consumer information, the F2F strategy aims to create a comprehensive and sustainable food system. The F2F strategy, as part of the EU's Green Deal, introduces a series of regulatory changes and incentives aimed at creating a more sustainable food system by 2030. This strategy has both direct and indirect implications for pollinators, which are essential for biodiversity and crop production. By focusing on sustainable agricultural practices, chemical use reduction, and habitat conservation, the strategy aligns with key factors that influence pollinator health and populations.

In conclusion, the F2F strategy offers a multi-faceted approach that supports pollinator health both directly, through reduced chemical inputs and habitat creation, and indirectly, through climate resilience and sustainable land-use practices. By integrating pollinator-friendly measures into broader food and environmental policies, the strategy creates a more favourable environment for pollinators, ultimately supporting biodiversity and agricultural productivity across Europe.

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In terms of cross-sectoral policy frameworks in the EU, six key frameworks are considered in the scoping analysis as they address key drivers of pollinator health. 1) The Chemicals Strategy for Sustainability (1) aims to reduce harmful pesticide use, while the EU Climate Law (2) tackles climate change impacts on pollinator habitats. The European Landscape Convention (3) and the Habitats and Birds Directives (4) promote the conservation of diverse landscapes and protected areas. The Sustainable Finance Disclosure Regulation (5) encourages investment in biodiversity-friendly practices, and the Nature Restoration Law (6) focuses on ecosystem restoration, directly benefiting pollinator habitats. In the following, these frameworks are further detailed.

Nature Restoration Law

The Nature Restoration Law, which entered into force in 2024, aims to restore degraded ecosystems and enhance biodiversity across Europe. It sets legally binding targets to restore habitats and species to their natural state, with a focus on improving ecosystems that are vital for climate resilience and biodiversity. The law promotes actions to restore wetlands, forests, grasslands, and marine environments. It also encourages sustainable land and water management practices to prevent further degradation. The law aims to support the EU's biodiversity goals and contribute to achieving the global 2030 biodiversity targets.

In response to the Nature Restoration Law, Member States are required to develop national restoration plans to achieve binding targets for restoring ecosystems and habitats by 2026. Specific actions include restoring wetlands, forests, grasslands, and marine ecosystems, as well as enhancing biodiversity in agricultural and urban areas. The law encourages the integration of nature restoration into land use, water management, and infrastructure planning. It also promotes the use of nature-based solutions to address climate change and environmental challenges. Regular monitoring and reporting will track progress, ensuring transparency and accountability in achieving restoration goals.

The Nature Restoration Law will potentially have a positive impact on conditions for pollinators by promoting the restoration of ecosystems that are crucial for their survival. The law also encourages sustainable agricultural practices that reduce pesticide use and support the creation of pollinator-friendly landscapes. Through these actions, the law aims to reverse the decline of pollinator populations, which are essential for biodiversity and food production. This may specifically have a direct impact on the environmental factors of (a) Land cover and configuration and (b) Land cover management.

Chemicals Strategy for Sustainability (including the Pesticide Reduction Act)

The Chemicals Strategy for Sustainability is part of the EU's zero pollution ambition, which is a key commitment of the European Green Deal. The EU already has sophisticated chemicals regulation in place. However, global chemicals production is expected to

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double by 2030, and the already widespread use of chemicals will also increase, including in consumer products.

The European Commission published the draft of the Chemicals Strategy for Sustainability on 14 October 2020 (EC, 2020a). The EU's chemicals strategy aims to: 1) better protect citizens and the environment and 2) boost innovation for safe and sustainable chemicals. Innovation for the green transition of the chemical industry and its value chains must be stepped up and the existing EU chemical policy must evolve and respond more rapidly and effectively to the challenges posed by hazardous chemicals. This includes ensuring that all chemicals are used more safely and sustainably, promoting that chemicals having a chronic effect for human health and the environment – substances of concern – are minimised and substituted as far as possible, and phasing out the most harmful ones for non-essential societal use, in particular in consumer products. This strategy represents the necessary first step towards Europe's zero pollution ambition and the related targets defined in the Biodiversity and F2F strategy, laying the foundations for the upcoming Zero Pollution Action Plan and contributing to the success of the Europe's Beating Cancer Plan, minimising the environmental footprint of chemicals in particular on climate change, resource use, ecosystems and biodiversity (including pollinators) from a lifecycle perspective.
The actions are the following ones:

- Banning the most harmful chemicals in consumer products - allowing their use only where essential.
- Account for the cocktail effect of chemicals when assessing risks from chemicals.
- Phasing out the use of per- and polyfluoroalkyl substances (PFAS) in the EU, unless their use is essential.
- Boosting the investment and innovative capacity for production and use of chemicals that are safe and sustainable by design, and throughout their life cycle.
- Promoting the EU's resilience of supply and sustainability of critical chemicals.
- Establishing a simpler "one substance one assessment" process for the risk and hazard assessment of chemicals.

By implementing these actions, the Chemicals Strategy for Sustainability aims to position the EU as a global leader in the fight against harmful chemicals by championing and promoting high standards and not exporting chemicals banned in the EU and contribute to a sustainable future.

Sustainable Finance Disclosure Regulation

The Sustainable Finance Disclosure Regulation (SFDR) is a framework for standardising the disclosure of sustainability related risks in finance, including the adverse effects that investments can have on sustainability (environmental and social outcomes) (EC, 2019b). It is grounded in the principle of "do no significant harm", which requires consideration of the environmental impacts of products throughout their whole life cycle. It is primarily

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targeted at agents that provide insurance or investment advice with the overall goal of improving the transparency of information on Environmental and Social impacts of their investment actions, including how they are measured.

The regulation, and its amendments, sets out reporting requirements and guidelines for:

- Information to be presented on websites, including their sustainability policies, methods for measuring and integrating sustainability, remuneration policies, adverse sustainability impacts of their products and periodic reporting (EC, 2019b).
- The first amendment (2020/852) sets out criteria for: Environmentally sustainable economic activities (defined as climate change mitigation or adaptation, sustainable use and protection of water resources, transition to a circular economy, pollution prevention and control, and the protection and restoration of biodiversity) and Transparency regarding the sustainability of investments and financial products (e.g. green loans) (EC, 2020c).
- Activities contributing significantly to the protection and restoration of biodiversity and ecosystems are defined as:
    - Contributing to the achieving or maintaining favourable conservation status,
    - Protecting or restoring ecosystems in order to improve their condition and enhance their capacity to provide ecosystem services,
    - The sustainable land management, forestry and agricultural practices.
- Significant harm to the protection and restoration of biodiversity and ecosystems should be considered across the lifetime of the investment and/or product and is defined as activities which are:
    - Significantly detrimental to the good condition and resilience of ecosystem;
    - Detrimental to the conservation status of habitats and species, including those of Union interest.
- Criteria for determining ("screening") the impact of economic activities include: identifying relevant contributions of the activity to the environmental objective, specifying minimum requirements and be quantitative and contain thresholds to the extent possible, and otherwise be qualitative. They should include sustainability indicators and include evidence where possible and should be easy to use.
- Technical standards in relation to "do no significant harm" are defined further in regulation 2022/1288, which sets out various exact definitions for transparency measures, including reporting and website content for investment firms (EC, 2022a).
- Standards for performance need to be benchmarked against a performance index. However, the indicators provided (Annex 1 of SFDR) mostly pertain to greenhouse gas emissions. Only one biodiversity metric is included: Activities negatively affecting biodiversity-sensitive areas (defined as Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas

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('KBAs'), as well as other protected areas, as referred to in SFDR's Appendix D of Annex II to Commission Delegated Regulation (EU) 2021/2139).

Activities that negatively affect biodiversity sensitive areas are defined as those that lead to the deterioration of habitats, or disturbed habitats or species for which a protected area has been established.

In terms of potential environmental impact, direct impacts are potentially borne on (1) Land cover and configuration and (2) Knowledge availability, through the requirements to disclose activities/investments that affect habitats. Further, indirect impacts may be foreseen on (3) Pesticides and agrochemicals, as part of the requirements for disclosures on environmental harm; (4) Economic support for pollinator protection and (5) Monitoring programmes, through support for sustainable investment activities (and their subsequent measurement), and (6) Regulation, through member state-specific implementation of these rules. However, monitoring does not include pollinators, and the biodiversity measure required under "do no significant harm" doesn't cover much biodiversity outside the most protected areas. The potential for investment and benefits, in the current form, is likely to be mostly focused on these areas.

Habitats and Birds Directive

The Habitats and Birds Directive (Directive 92/43/EEC) aims to conserve natural habitats and wild fauna and flora across the EU, ensuring the protection of biodiversity through the establishment of special areas of conservation (SACs) (EC, 1992). It also seeks to safeguard endangered species of birds by creating special protection areas (SPAs). The directive promotes sustainable land use practices that do not negatively impact habitats or species, while establishing mechanisms for monitoring, reporting, and managing Natura 2000 sites to maintain biodiversity.

Various actions are pursued to protect and conserve biodiversity across Europe. Member States are required to designate and manage a network of protected areas, known as Natura 2000, which includes SACs) and SPAs. These sites must be maintained and managed to ensure the preservation of species and habitats in their natural state. Additionally, the directive mandates the protection of endangered species, the implementation of sustainable land-use practices, and the adoption of conservation measures such as habitat restoration, monitoring, and reporting on the status of species and habitats. Furthermore, member states are encouraged to integrate biodiversity considerations into other policies and sectors, including agriculture, forestry, and fisheries, to ensure that activities do not harm protected areas or species.

The directive focuses on conserving habitats and species that are considered of European importance, and while pollinators are not the primary focus, their protection is indirectly supported through habitat conservation and the preservation of biodiversity. Thus, by setting conditions for (1) Land cover and configuration, (2) Land cover management and (3) Pesticides and agrochemicals, the directive has a direct impact on pollinators.

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European Landscape Convention

The European Landscape Convention is a treaty of the Council of Europe that aims to promote landscape protection, management and planning, and to organise co-operation between the Parties to the convention, including the EU and related countries including United Kingdom, Norway and Switzerland (CE, 2016). The convention applies to the entire territory of the Parties and covers natural, rural, urban, and peri-urban areas. It includes land, inland water, and marine areas. It concerns landscapes that might be considered outstanding as well as everyday or degraded landscapes.

The European Landscape Convention reflect the importance of multi-level governance across partner countries and the public. For the purposes of the European Landscape Convention:

- "Landscape" means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors;
- "Landscape policy" means an expression by the competent public authorities of general principles, strategies and guidelines that permit the taking of specific measures aimed at the protection, management, and planning of landscapes;
- "Landscape quality objective" means, for a specific landscape, the formulation by the competent public authorities of the aspirations of the public with regard to the landscape features of their surroundings;
- "Landscape protection" means actions to conserve and maintain the significant or characteristic features of a landscape, justified by its heritage value derived from its natural configuration and/or from human activity;
- "Landscape management" means action, from a perspective of sustainable development, to ensure the regular upkeep of a landscape, so as to guide and harmonise changes which are brought about by social, economic, and environmental processes;
- "Landscape planning" means strong forward-looking action to enhance, restore, or create landscapes.

This Convention stresses that landscapes have important public interest roles in the cultural, ecological, environmental, and social fields, and constitutes a resource favourable to economic activity and whose protection, management, and planning can contribute to job creation thus also influencing the enabling conditions for pollinator health.

The European Climate Law

The European Climate Law (2021/1119) sets a legally binding target for the EU to achieve climate neutrality by 2050 (EC, 2021b). This means that the EU aims to balance its greenhouse gas emissions with removals, effectively reaching net-zero emissions. Main objectives are to achieve climate neutrality by 2050, aligning with the Paris Agreement's long-term temperature goals. The regulation further establishes intermediate targets for reducing greenhouse gas emissions by 2030 and 2040. The EU aims to enhance its

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adaptive capacity and resilience to the impacts of climate change, promoting a socially fair transition to a climate-neutral economy, ensuring that no one is left behind by encouraging public participation in the transition to a climate-neutral society.

The actions include setting binding targets for greenhouse gas emissions reductions and climate neutrality by establishing a framework for policies and measures to achieve these targets, including:

- Emissions trading systems,
- National climate action plans,
- Renewable energy targets,
- Energy efficiency measures,
- Carbon pricing,
- Research and innovation.

The EU will further develop and implement a comprehensive strategy to adapt to the impacts of climate change, including with respect to Monitoring, Reporting and Verification of progress towards climate neutrality. Besides, cooperation with other countries and international organisations to promote climate action and support developing countries. By implementing these actions, the European Climate Law aims to position the EU as a global leader in the fight against climate change and contribute to a sustainable future.

While primarily focused on reducing carbon emissions and mitigating climate change, the European Climate Law has both direct and indirect impacts on pollinators through its influence on land use, biodiversity conservation, and agricultural practices across member states. Reducing the impact of climate change will directly reduce a driver for pollinator decline, while a number of the actions adopted in the implementation of the Law will also influence the environmental factors of relevance to pollinators, such as Land cover and configuration as well as Land cover management.

SECTORAL POLICY FRAMEWORKS

In terms of sectoral policy frameworks in the EU, eight key frameworks are considered in the scoping analysis as they address key drivers of pollinator health. The Common Agricultural Policy (CAP), eco-schemes, and specific Agri-Environment-Climate Measures (AECMs) (1) influence pollinator habitats through incentives for sustainable farming practices. Programmes like the European Apiculture Programme (2) and the EU Pollinators Initiative (EPI) (3) directly address pollinator conservation, while the EU Pollinator Monitoring Scheme (EUPoMS) (4) tracks their population trends. The Soil Strategy for 2030 (5) and the EU Biodiversity Strategy 96) promote ecosystems crucial for pollinator survival. Additionally, energy policies, including the Renewable Energy Directive (7) and the EU Solar Strategy (8), potentially influence land use while pursuing climate targets that are also indirectly a driver of pollinator decline. In the following, these frameworks are further detailed.

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Common Agricultural Policy (CAP)

Since the CAP is the key policy in the agricultural domain, particular consideration is given to this specific policy. In the following we split the description of the policy into three distinct domains,:1) the conditionality of the CAP in Pillar I, 2) the Eco-Schemes in Pillar I, and 3) the Agri-environment-climate measures of Pillar II.

CAP: Conditionality

The objective of the conditionality requirements under the CAP is to link farmers' access to payments (such as direct payments and certain rural development funding) to their compliance with specific legal environmental, climate, and public health standards (some of which influence conditions for pollinators) (EC, 2024a). This provides an incentive for farmers to contribute to environmental sustainability in exchange for financial support.

A series of regulatory requirements are developed falling into two broad categories - Statutory management requirements (SMRs) and Good agricultural and environmental conditions (GAECs).

SMRs apply to all farmers whether or not they receive support under the CAP. 11 SMRs are currently in place, of most relevance to pollinator health being SMRs 1 and 2 which detail the need for farmers to adhere to the provisions under the Birds and Habitat directive. Non-compliance with SMRs can result in reductions or penalties on CAP payments.

GAECs, on the other hand, apply only to farmers receiving support under the CAP. Nine different GAECs are currently in place, generally defined below:

- GAEC 1: Maintain a certain share of permanent grassland of the total agricultural area;
- GAEC 2: Protect wetlands and peatlands;
- GAEC 3: Maintain soil organic matter and soil structure through a ban of burning arable stubble;
- GAEC 4: Protect water from pollution through the establishment of buffer strips along water courses;
- GAEC 5: Prevent soil erosion through relevant practices;
- GAEC 6: Protect soil by defining rules for minimum soil cover;
- GAEC 7: Preserve the soil potential through field level crop rotation within farms;
- GAEC 8: maintain non-productive areas and landscape features, and ensure the retention of landscape features (GAEC 8 also included a requirement for each farm to dedicate at least 4% of their agricultural area as non-productive elements, which is now abolished (although an exemption was issued for most countries);
- GAEC 9: Protect environmentally sensitive permanent grasslands in Natura 2000 sites.

As a part of the CAP strategic planning, it is the responsibility of the individual member states to set specific conditions for each of these in the national implementation (EC, 2022b).

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Overall, these provisions are important to maintain the environmental protection of farmland ensuring conditions for a lasting maintenance of the environmental conditions. However, since these provisions have been in place for some time it does not result in an improvement of the environmental impact compared with the present baseline.

CAP: Eco-schemes

The eco-schemes represent one of the novel elements introduced in the EU's CAP for 2023-2027, as part of its Green Architecture, to improve the environmental and climate performance of agricultural activities (2024b). These schemes aim at supporting farmers in adopting practices that minimise the negative impact of agriculture on the environment and climate and help them evolve towards more sustainable farming models. They are geared towards sustainable land use, rewarding farmers for taking care of the climate, landscapes and the environment, and animal welfare. Through eco-schemes, the EU rewards farmers for preserving natural resources and providing public goods, which are benefits to the public that are not reflected in market prices. Eco-schemes are instrumental in advancing the objectives of the European Green Deal and in meeting the targets outlined in the F2F Strategy and the Biodiversity Strategy, which together aim to create a more sustainable and resilient food system in Europe.

The actions of the CAP eco-schemes lie in providing payments for voluntary and mostly annual commitments beneficial for the climate, environment, and animal welfare, based on a set of basic requirements and standards farmers and land managers must fulfil to be entitled to area and animal-based payments under the CAP.

Four flagship eco-schemes announced in the F2F Strategy included agroforestry, agroecology, precision farming, and carbon farming. The EC regulation (Article 31 "Schemes for the climate, the environment and animal welfare" of the Regulation (EU) 2021/2115) stipulates seven (a-g) areas of actions that the eco-schemes shall cover, most of which bear some effect on pollinators, yet none of the area descriptions make an explicit reference to pollinators. The following three (emphasis added) come closest: "(b) climate change adaptation, including actions to improve the resilience of food production systems and animal and plant diversity for stronger resistance to diseases and climate change"; "(e) protection of biodiversity, conservation or restoration of habitats or species, including maintenance and creation of landscape features or non-productive areas"; and "(f) actions for a sustainable and reduced use of pesticides, in particular pesticides that present a risk for human health or environment".

A total of 158 eco-schemes have been designed across the 27 EU Member States (MSs), featuring a wide diversity of the various measures in terms of their scope, level of ambition, and financial structure (NABU, 2024). The majority addresses biodiversity-promoting measures through the provision of unproductive areas or fallow land or buffer strips; the creation of landscape elements or soil protection through the creation of vegetation cover over the winter or in inter-rows of permanent crops. Other measures

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concern the diversification and expansion of crop rotation on arable land, extensive grazing, and the maintenance of organic farming.

The majority of eco-schemes launched in 2023 target arable land, followed by grassland and permanent crops. The four groups of most widespread activities across MS are:

1. Support for soil conservation practices;
2. Preserving biodiversity and landscape features;
3. Sustainable and reduced use of pesticides;
4. Support to organic farming.

The level of ambition and the resulting environmental impact (in terms of biodiversity) is very heterogeneous, as is the design of eco-schemes by the MSs themselves. It is noted that based on the expected environmental impact the eco-schemes can be categorised into six classes, ranging from environmentally very effective to environmentally harmful. Some concern on their effectiveness in supporting pollinators relates to the mostly annual nature of the schemes that prevent continuity, as well as the potentially limited additionally of the individual schemes.

Several EU MS have designed eco-schemes that include measures specifically for pollinator health, such as planting melliferous (pollinator-friendly) plants and creating or maintaining hedgerows as part of broader agroecological initiatives. Among the EU MSs that have incorporated eco-schemes that explicitly reference and support pollinator-friendly practices (e.g., FR, EI, ES, NL, PL, IT) these generally focus on habitat preservation, enhancing landscape features, and promoting biodiversity through crop and land management. These practices aim to enhance biodiversity, provide habitats for pollinators, and improve ecosystem services. In that respect Eco-schemes have a direct influence on Land cover and configuration as well as Land cover management, but it is important to note that the specific impact in a certain place is highly context dependent.

CAP: Agri-Environment-Climate Measures

Agri-Environment-Climate Measures (AECM) are voluntary measures of the second pillar of the CAP 2021-2027 (EC, 2022b). Their goal is to encourage farmers to adopt sustainable farming practices in order to address challenges such as biodiversity loss and more specifically pollinators' decline, climate change, landscape preservation, protection of soil and water and simultaneously increase the positive effects generated from agriculture. Their main objectives are the reduction of pesticides and to mainly focus on mineral fertilizers and/or plant protection products, the cooperation between farmers through a collective contract concerning the adoption of certain measures, and lastly a result-based approach, in which payments are linked directly to outcomes thus having an easier control and an increase in policy effectiveness. Concerning pollinator targeted practices, it is important to note that the MSs design their own programme of measures, that may or may not consider measures directly or indirectly impacting pollinators, but a few examples are more widespread. Firstly, the planting of wildflower strips and buffer zones along the field edges in order to create nesting habitats and foraging resources for wild

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pollinators; secondly, the maintenance of hedgerows which provide shelter and pollen-rich plants such as hawthorn and blackthorn; and lastly, reduced pesticide use that enables the creation of safe zones for pollinators.

AECMs compensate farmers for their income losses by following environment-friendly and sustainable practices, thus encouraging the adoption of said practices. There is a wide number of different AECMs across Europe focusing on different ecosystem services. An example of a voluntary measure designed to protect pollinators are the three French measures that were created under the Rural Development programme 2014-2020 (ENRD, 2024);

- **HERBE 07,** which aimed to promote permanent grasslands by having farmers under a five-year contract and receive payments for their services per ha per year. Farmers also had the obligation to conserve and enrich these permanent grasslands and sustain the floral diversity.
- **PHYTO 02,** which aimed to eliminate the herbicides' use. The farmers that participate in this measure have two options - either reduce the use of herbicides by 40% in all farming land, or eliminate all herbicides' use between the crop rows to avoid their residues on crops.
- **COUVER 07,** which aimed to create and maintain buffer strips (e.g., hedgerows, wildflower strips, etc.) within the farmland to conserve and protect specific biodiversity species. For this AECM to work, a specific species has to be selected from a proposed national list so that the nesting and foraging habitats created are suitable for this species, in combination with other agricultural practices that must be adopted by farmers, such as the total ban of pesticides' use for a specific amount of time.

Further, a more generalised list of relevant measures were implemented across countries in the CAP 2021-27 programme (ENRD, 2024), including:

- **Afforestation and Woodland Creation:** The main objective of this measure is to promote climate mitigation, as afforestation helps reduce the greenhouse effects, control soil erosion and water management, and, lastly, biodiversity, as forested areas create habitats for wildlife, such as wild pollinators (EC, 2022b; ENRD, 2024). More specifically, the adoption of this measure contributes to the conservation of wild pollinators and the enhancement of their populations as trees and forested areas provide shelter and foraging options for bees and other pollinators. Also, woodland edges provide abundant resources due to the variety of plant species. This incentive encourages farmers to plant forests and convert agricultural land into new woodlands by supporting them financially. In addition, it promotes the establishment of new agroforestry systems (trees and agricultural crops occupy the same land), the conservation and promotion of forest genetic resources, land management contracts for forest-environment-climate services and forest conservation and the investment in forest technologies and in mobilising, processing and marketing of forest products.

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- **Support for High-Nature-Value (HNV) Farmland and Natura 2000 Sites:** In the context of the CAP, the EU decided to preserve and manage areas with rich biodiversity, often high in pollinator populations, by classifying them into High-Nature-Value (HNV) Farmland and Natura 2000 Sites, thus allowing their protection and their strengthening (EC, 2022b; ENRD, 2024). This classification entails specific restrictions in pesticides' use and soil disturbance, which allow for a protected environment that benefits pollinators' breeding and feeding habitats. Also, High-Nature-Value (HNV) Farmland and Natura 2000 Sites typically include meadows, grasslands and generally diverse plant species, which provide pollen and nectar resources. More specifically, concerning HNV, farmers receive financial support to adopt methods such as haymaking, rotational grazing, polyculture, and low-intensity farming practices that avoid synthetic fertilizers and pesticides. Similarly, farmers whose land is within or near Natura 2000 sites may receive financial aid to manage their land based on the safeguard and protection of these habitats and for compensation for loss of income by operating within them. These practices entail limited use of chemicals, controlled grazing, preserving wetlands, and certain targeted actions for the safeguard of the local biodiversity, such as creating nesting sites, controlling invasive species, or providing food for pollinators.
- **Agroforestry Support:** Agroforestry Support is an incentive of the EU CAP for supporting sustainable land use and more specifically, the establishment and maintenance of agroforestry systems such as silvo-arable systems (trees in crop fields) and silvo-pastoral systems (trees in grazing areas) (EC, 2022b; ENRD, 2024). The objective of this incentive is to fund the integration of trees within the farmland to encourage farmers to adopt this practice. According to the United Nations, such land use systems are more adaptable in the effects of climate change and can also improve food quality, crop productivity, and biodiversity. Also, agroforestry systems provide foraging and nesting habitats for wild pollinators and natural paths through trees and shrubs to enable a safe crossing along different landscapes. The actions required from the farmers for receiving financial aid are the establishment of a suitable agroforestry system and selection of suitable tree species based on their land, the implementation of sustainable management practices (minimal chemical use, pruning, soil conservation), the protection of young trees from livestock damage, the monitoring and report of these actions' positive outcomes, and, lastly, the commitment in maintaining the agroforestry system over a period of 5 to 10 years..
- **Non-Productive Investments (NPIs):** NPIs are environmental actions on a farm-level scale, which provide funding for on-farm structures where farmers and land managers can invest on their own land by adopting practices that do not lead directly to agricultural production but instead support biodiversity and sustainability (ECA, 2015). The main objectives of this incentive are the enhancement of biodiversity, the improvement of water quality and management, and soil conservation and health. Some of the practices linked to NPIs are the restoration of wetlands, hedges and dry-stone walls, as well as the creation or restoration of a habitat or landscape element that is important for pollinators (heathland, species-rich grassland, floristically enhanced grass margins), the

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provision of water resources, and protection of aquatic ecosystems by reducing nutrient and sediment runoff into water bodies, etc.

- **Knowledge Transfer and Advisory Services:** Knowledge Transfer and Advisory Services is a group of measures funded by the CAP's rural development incentive which aims to educate, inform and overall ameliorate the farmers' and rural communities' skills to a more sustainable and environmentally friendly approach in agriculture and its practices (EC, 2022b; ENRD, 2024). By doing so, farmers and land managers can access all the information needed to address contemporary problems such as pollinators' decline, climate change, etc., and thus creating a friendlier to pollinators agricultural landscape. The main actions linked to the Knowledge Transfer measures are vocational training and skills acquisition actions, demonstration activities and information actions, and long-term farm and forest management exchange as well as farm and forests visits. Concerning the Advisory Services, the main actions are the support to help benefit from the use of advisory services, the support for the setting up of farm management, farm relief, farm and forest advisory services, and, lastly, the support for training of advisors. The beneficiaries of the funding are the ones providing these services and not the users or recipients.
- **Organic Farming:** Organic Farming is an agricultural method to produce food using natural substances and processes, contributing to greater biodiversity and less water, air, and soil pollution, thus making agriculture more sustainable (ECA, 2024). Its main objectives are animal welfare, respect nature's systems and cycles, and preserve the natural landscape with all its components, such as pollinators, while producing high-quality food. The main action of the Organic Farming Support incentive of the EU is to support farmers who transition to organic farming and thus contribute to the sustainability of agriculture and natural resources such as wild pollinators. More specifically, the minimised use of pesticides by banning the synthetic ones and thus providing a safer environment for pollinators, and the promotion of diverse cropping systems, as polycultures and general crop rotation, enhance the variety of habitats for pollinators and promotes soil health. In addition, farmers must adopt practices protecting water resources such as use of water-efficient irrigation methods.

Bee Health Regulation and European Apiculture Programme

The European Bee Health Regulation (2016/429) sets out guidelines for preventing and controlling bee diseases, such as Nosema, American foulbrood, and Varroa mites (EC, 2016). It includes rules on the movement of bees within the EU to prevent the spread of diseases, ensuring that honeybees are transported safely across regions while minimising the risk of contamination. Further, to support the decline of the apiculture sector in Europe, the EC launched the National Apiculture programme (EC, 2013). Following this initiative, every MS has the option to launch a three-year Nation Action Plan aiming to support the national apiculture sector by implementing five specific actions. The proposed actions of the initiative focus on:

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- Providing technical assistance to beekeepers (e.g. training beekeepers on subjects such as diseases prevention, breeding, new practices, etc.);
- Combating beehive diseases (e.g. varroa mite, CCD, etc.);
- Market monitoring for better placement of hive products;
- Enhancement of honey quality;
- Analyses of apiculture products (e.g. honey, wax, royal jelly, etc.)

These actions are highly recommended to be in complementarity with the actions of the Pollinators Initiative to attain better results in both managed and wild pollinators. Among the different MSs that are implementing this initiative, France launched its National Action Plan, for the very first time, in 2013 and since then it has renewed it every three years. This Plan focuses mainly on two strategic actions. Firstly, to reduce beehive mortality by 30% by focusing on beehive diseases, and, secondly, to reduce the stressors of agricultural activity, such as pesticides and deterioration of natural habitats.

Soil Strategy for 2030

The Soil Strategy for 2030 aims to ensure healthy and sustainable soil management across the EU by addressing several key objectives (EC, 2021a). It seeks to combat soil degradation by preventing erosion, compaction, and organic matter loss to enhance fertility. The strategy promotes soil's role in mitigating climate change by increasing carbon sequestration. Protecting soil biodiversity is a priority, ensuring its function as a vital ecosystem and resource for agriculture. It also emphasizes the restoration of degraded lands to maintain ecosystem services and resilience. Finally, the strategy supports sustainable land use in farming and forestry to balance environmental, economic, and societal needs, aligning with the European Green Deal and the Biodiversity Strategy. In pursuance of the Soil Strategy provisions to ensure carbon sequestration by carbon farming practices including rewetting peatlands, cover crops, agroforestry is proposed, this should contribute with 42 M ton by 2030 (EC, 2021a).

The Soil Strategy for 2030 outlines a set of actions to improve soil health (ability of soil to function) and sustainability across the EU. It promotes sustainable soil management practices, such as regenerative agriculture and agroforestry, to enhance carbon sequestration and reduce nutrient losses. Efforts include restoring degraded soils, remediating contamination, and combating desertification. The strategy also proposes the development of a Soil Health Law, aiming to establish legally binding objectives. These actions align with broader goals on climate, biodiversity, and sustainable development. The strategy aligns with concerns for pollinators by promoting soil health practices that support plant diversity, such as agroforestry and regenerative agriculture.

EU Pollinators Initiative

The EU Pollinators Initiative (EPI) was first introduced in 2018 and since then it has been revised and renewed in 2023 aiming to reverse pollinators' decline by 2030 through comprehensive strategies (EC, 2018). This measure provides financial support to MSs to

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implement National Action Plans for the protection of wild pollinators. The main objectives of the revised EPI are:

- Improving the knowledge around pollinators, the causes and consequences of their decline and overall behaviour of different species;
- Mitigating the causes of their decline by reducing pesticides use, preserving their habitats, and supporting pollinator-friendly agricultural practices;
- Educating, raising awareness and endorsing collaborations among farmers, land managers, policy makers, and the public to ensure productive collaboration;
- Monitoring pollinators.

This initiative represents an integrated approach in monitoring, protecting, and improving the status of pollinators across the EU and plays a critical role in meeting the goals of the EU's Biodiversity Strategy for 2030, contributing to healthier ecosystems and sustainable agriculture. In the first round of this initiative 2017-2020, there were only two countries that developed action plans, France and the UK. The French National Action Plan called "France, terre de pollinisateurs (2017-2020)" included 20 actions to address the above objectives:

- six actions for monitoring and examining the wild pollinators dynamics and evaluate their importance;
- six actions aiming at raising public awareness of the benefits of wild pollination services;
- eight actions to encourage all implementing actors (e.g. farmers) adopt novel practices for the protection of wild pollinators.

EU Pollinator Monitoring Scheme (EUPoMS)

The EU Pollinator Monitoring Scheme was launched in 2021(although national monitoring is not yet in place), in the context of the EPI's objectives, as a tool for creating standardised monitoring for pollinators across the EU (Potts et al., 2024). It will provide reliable data on pollinator populations by establishing methods for long-term monitoring and supporting data collection across diverse ecosystems. The aim is to gather actionable insights into pollinator trends, which are essential for designing and adjusting policies to better protect these species. Together, the EPI and EUPoMS provide a structured and evidence-based approach to address pollinator decline, ensuring that the efforts are measurable and that policies can be adapted based on scientific data.

Similarly to the EPI, the EU Pollinator Monitoring Scheme is linked to initiatives of the 2nd pillar of the CAP such as AECMs and NPIS that support financially farmers who implement pollinator-friendly practices to their agricultural systems, as well as methods for monitoring pollinator populations and general data collection.

EU Biodiversity Strategy

The new 2030 Biodiversity Strategy is a comprehensive, systemic, and ambitious long-term plan for protecting nature and reversing the degradation of ecosystems (EC, 2021).

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It is a key pillar of the European Green Deal and of EU leadership on international action for global public goods and sustainable development goals. With an objective to put Europe's biodiversity to recovery by 2030, the Strategy sets out new ways to implement existing legislation more effectively, new commitments, measures, targets, and governance mechanisms. These include:

- Transforming at least 30% of Europe's lands and seas into effectively managed protected areas. The goal is to build upon (1) existing Natura 2000 areas, complementing them with (2) nationally protected areas, (3) while ensuring strict protection for areas of very high biodiversity and climate value.
- Restoring degraded ecosystems across the EU that are in a poor state, as well as reducing pressures on biodiversity. The Strategy proposes a far-reaching EU Nature Restoration Plan that includes developing a proposal for a new legal framework for nature restoration, with binding targets to restore damaged ecosystems, including the most-carbon-rich ones. Improving the conservation status or trend of at least 30% of EU protected habitats and species that are not in a favourable status
- Restoring at least 25,000 km of rivers to be free-flowing
- Halting and reversing the decline in farmland birds and insects, particularly pollinators
- Reducing the overall use of and risk from chemical pesticides, and reducing the use of the more hazardous/dangerous ones by 50%
- Managing at least 25% of agricultural land under organic farming, and significantly enhancing the uptake of agro-ecological practices
- Reducing the losses of nutrients from fertilisers by at least 50% and fertiliser use by at least 20%
- Planting at least 3 billion trees, in full respect of ecological principles and protecting the remaining primary and old-growth forests.

Renewable Energy Directive (RED)

The Renewable Energy Directive (2009/28/EC) sets an overall renewable energy target of at least 42.5% binding at EU level by 2030, but aiming for 45%. The original directive and the amended directive (2023/2413) establish sustainability criteria for biomass and designation of bioenergy projects, including preventing biomass sourced from high-biodiversity or carbon-rich areas and ensuring sustainable forestry and agricultural practices to reduce indirect land use change (ILUC) effects.

The increasing share of renewable energy will significantly accelerate the current pace of deployment of renewable energy projects across the EU, for instance, by way of simplifying permitting processes and regulatory frameworks to facilitate the faster deployment. This may also influence overall land use patterns and thus conditions for

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pollinators and pollination services. Of most relevance to pollinators RED directly influence land use patterns:

- Designating areas for bioenergy projects and organic material: RED outlines sustainability and land-use criteria that guide where biomass for bioenergy can be sourced. Designated areas for bioenergy production should not harm biodiversity by environmental impact assessment of projects, monitoring of installations and integrating bioenergy production into broader land use planning frameworks. MSs must ensure that bioenergy feedstock does not come from protected areas or high-biodiversity ecosystems, such as primary forests, protected grasslands, and Natura 2000 sites, or from carbon-rich lands like wetlands and peatlands.
- Preventing Indirect Land Use Changes (ILUC): The use of biofuels, bioliquids, and biomass fuels derived from food and feed crops is capped at 7% of the final energy consumption in the transport sector in each EU MS. High ILUC-risk biofuels (produced from feedstocks associated with significant land-use changes, such as deforestation or the conversion of carbon-rich areas to agricultural land) should be phased out by 2030.

EU Solar Strategy

The EU Solar strategy aims to bring online over 320 GW of solar photovoltaic by 2025 (more than doubling compared to 2020) and almost 600 GW by 2030. This implies that across the EU in this decade, the EU will need to install, on average, approximately 45 GW per year (EC, 2022c). The REPowerEU Plan, launched by the EC in 2022, lays out several actions to accelerate solar energy deployment across the EU. The aim is to ensure an increasing entrance of private investments in photovaltaic systems in the EU. Most of the funding will come from the private sector (26 billion Euros). Several actions are pursued, including simplification of permitting procedures, and the EU Large-Scale Skills Partnership provides support for training programmes to develop a workforce capable of meeting the demands of the expanding solar sector. Further, the European Solar Rooftops Initiative requires installation of solar panels on new commercial and public buildings (by 2027) and new residential buildings by 2029.

Thus far a substantial share of solar panels has been established on agricultural land due to the cost-effectiveness of establishing solar panels in solar parks, as opposed to installations on buildings. Such installations directly influence the land cover, which may potentially be both positive and negative for pollinators depending on the nature of the change. Panels installed on former farmland area can permit the habitat creation for pollinators in an environment free of pesticides and soil disturbance. The actual value for pollinators will depend on the pollinator friendly actions implemented along with the installation and maintenance of the panels.

OBJECTIVES, MEASURES AND INSTRUMENTS

Based on the scoping of overarching policy frameworks, cross-sectoral policies, and sectoral policies, the following section summarises the key findings and outlines a list of

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the key policy objectives, measures and instruments that have been used in the expert survey and workshop.

Several of the reviewed EU policies have been identified to have a direct impact on factors such as land cover, land configuration, and land management (see Figure 7). However, their impact on pesticides and agrochemicals is less direct, although there is an indirect effect of agrochemical use on both wild and managed pollinators. Given the overall strategic nature, most policies do not directly employ specific instruments but exert an indirect influence by specifying non-binding objectives to be pursued by individual MS or other governing bodies. The exceptions are the European Green Deal and the Biodiversity Strategy for 2030, which each involve a set of instruments aimed at promoting behavioural change regarding pollinator conservation.

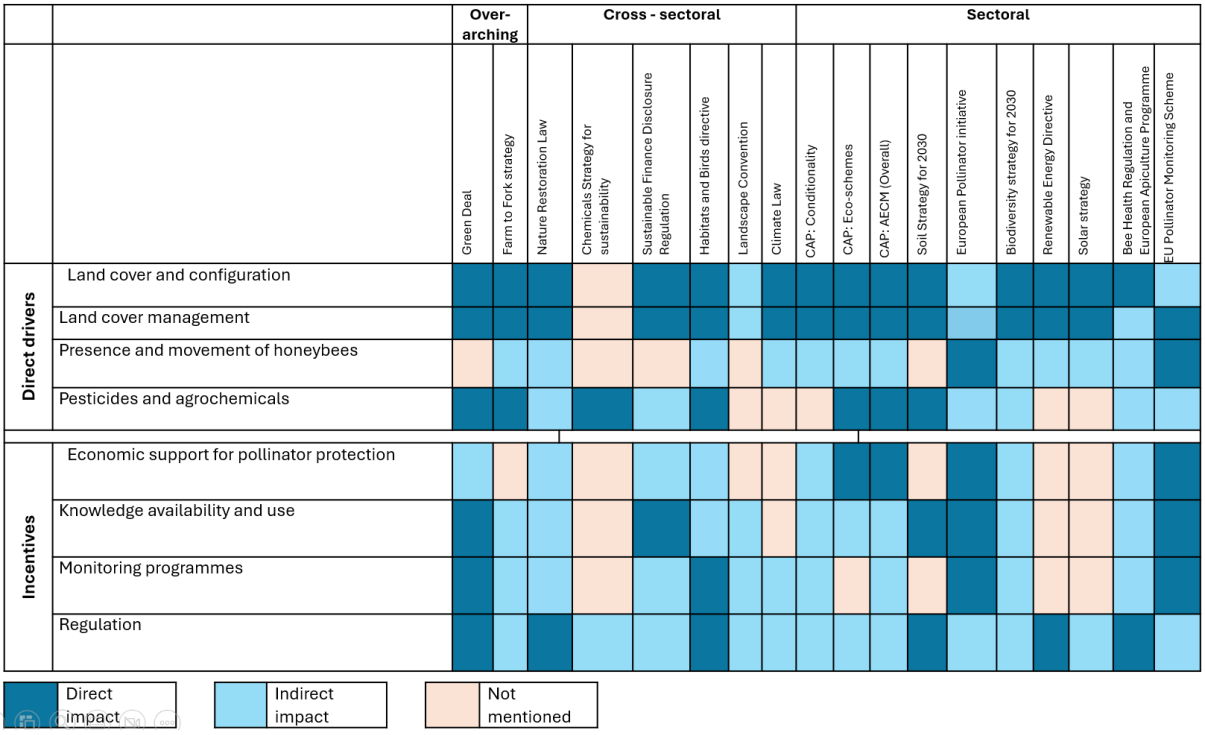

Figure 7: Impact of EU policy frameworks on the environmental factors used in the analysis, impact can be both negative and positive for pollinators.

This analysis represents a broad selection of policy initiatives across four policy silos. In terms of policy coherence, 11 strategic objectives and 13 policy measures and instruments were identified for the expert survey and workshop (see lists below). As previously mentioned, these aspects were selected through dialogue between pollinator experts from the RestPoll project, with additional input from the project's steering group, which also includes EU-level policymakers.

Identified **strategic objectives** (from six selected policies) include the following ones:

- *Farm to Fork Strategy*: Reduce the use of chemical pesticides by 50% by 2030 (baseline 2018) (Pesticide reduction);

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- *Farm to Fork Strategy*: Cut nutrient losses by 50% by 2030 (baseline 2018) (Nutrient loss);
- *Farm to Fork Strategy*: Reduce fertilizer use by at least 20% (baseline 2018);
- *Farm to Fork Strategy*: Increase the share of organic farming to 25% of agricultural land by 2030 (Organic farming);
- *Soil Strategy*: Improve *carbon (C)* sequestration by carbon farming practices (rewetting peatlands, cover crops, agroforestry), 42 M ton by 2030 (Carbon farming);
- *Solar Strategy*: Install 320 GW of solar panels (Solar panels);
- *Renewable Energy Directive III*: Increase the production of biomass for energy production for heating and cooling by 1.1 % per annum (Biomass increase);
- *Nature Restoration Law*: Restore at least 20% of the EU's land and sea areas by 2030 (Restoration);
- *Biodiversity Strategy for 2030*: Implement a European pollinator monitoring scheme across all MSs following a scientific protocol (Pollinator monitoring);
- *Biodiversity Strategy for 2030*: Double external funding for biodiversity to 7 billion euros (Biodiversity funding);
- *Biodiversity Strategy for 2030*: Plant 3 billion new trees before 2030 in urban areas and on farmland (Tree planting).

These objectives are the most important to focus on because they directly or indirectly influence the four direct drivers listed under environmental factors and thus the health and survival of pollinators, which are essential for biodiversity, food production, and ecosystem services. These objectives are interconnected and are analysed together to assess how they will collectively impact pollinators.

In the selection of strategic objectives we have considered that agriculture is the primary driver of pollinator decline due to the overuse of pesticides, fertilizers, and extent of monoculture farming. By focusing on reducing chemical inputs and promoting organic farming, these policy objectives potentially contribute directly to creating a safer and more sustainable environment for pollinators. Further, healthy soils and agricultural practices such as agroforestry and cover cropping are crucial for maintaining diverse ecosystems that support pollinator habitats and food sources. Objectives also links climate action with biodiversity conservation, potentially offering win-win solutions. Habitat restoration is one of the most effective ways to reverse pollinator decline. Restoring ecosystems will provide crucial habitats for pollinators, enhancing their ability to thrive and ensuring long-term biodiversity. Finally, renewable energy projects (solar & biomass production), if not managed carefully, can disrupt pollinator habitats. However, integrating pollinator-friendly practices, like planting wildflowers under solar panels, can create new habitats, making these energy strategies compatible with pollinator conservation.

Further, in terms of **regulatory measures** the emphasis is placed on 10 regulatory initiatives that are comparable across EU countries, thus focusing on the 9 GAEC

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standards along with requirements for designating Natura 2000 sites. These measures and instruments comprise:

- GAEC 1: Maintain permanent grasslands;
- GAEC 2: Protect wetlands and peatlands;
- GAEC 3: Maintain soil organic matter and soil structure through a ban of burning arable stubble;
- GAEC 4: Protect water from pollution through the establishment of buffer strips along water courses;
- GAEC 5: Prevent soil erosion through relevant practices;
- GAEC 6: Protect soil by defining rules for minimum soil cover;
- GAEC 7: Preserve the soil potential through field level crop rotation within farms;
- GAEC 8: Ensure the maintenance of non-productive areas and landscape features, and the retention of landscape features through, for example, a ban on cutting hedges and trees during the bird breeding and rearing season;
- GAEC 9: Protect environmentally sensitive permanent grasslands in Natura 2000 sites;
- Establish designated Natura 2000 sites.

These regulatory measures are relevant to consider for the policy coherence analysis because the regulatory standard outlined in the nine GAECs is somewhat comparable across all European countries; further, each GAEC have an impact on the four direct drivers. Measures like maintaining permanent grasslands (GAEC 1) and protecting wetlands and peatlands (GAEC 2) are vital for preserving habitats that support pollinators and enhance biodiversity. Measures such as preventing soil erosion (GAEC 5), maintaining soil structure (GAEC 3), and protecting water through buffer strips (GAEC 4) ensure the health of ecosystems that pollinators depend on for food and habitat. Crop rotation (GAEC 7) and minimum soil cover (GAEC 6) maintain soil fertility, encourage plant diversity, and reduce agricultural practices that harm pollinator habitats. Preserving non-productive areas (GAEC 8) like hedgerows and trees provides essential foraging and nesting sites for pollinators, promoting ecosystem connectivity. Safeguarding permanent grasslands in Natura 2000 sites (GAEC 9) helps protect biodiversity-rich areas, crucial for sustaining populations of pollinators, especially in sensitive environments. However, these measures are not directly implemented to promote biodiversity or pollinator health. On the other hand, Natura 2000 sites are crucial for biodiversity protection, providing protected habitats that support biodiversity and essential ecosystem services, making them an important aspect of the analysis.

Aside from these regulatory measures, three categories of voluntary measures (schemes that offer financial incentives to farmers and land managers who choose to adopt environmentally friendly practices that go beyond statutory requirements) these are all funded by the CAP. supporting the various objectives and needs identified in national CAP strategic plans, including:

- Advisory service;
- Eco-schemes;
- Agri-environmental and climate measures.

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According to Moldoveanu, Maggioni, and Dani (2024) there is some divergence across countries with respect to which policy measures are available for land users. This part of the results thus needs to be interpreted with reference to the national availability of measures.

SURVEY AMONG POLLINATOR EXPERTS

The following section introduces the findings from the survey among pollinator experts (see Appendix B), initially presenting responses on their perspective on the effect of the EU strategic policy objectives, measures and instruments. Towards the end their overall perspectives on the effects of the CAP and opportunities for improvements is outlined.

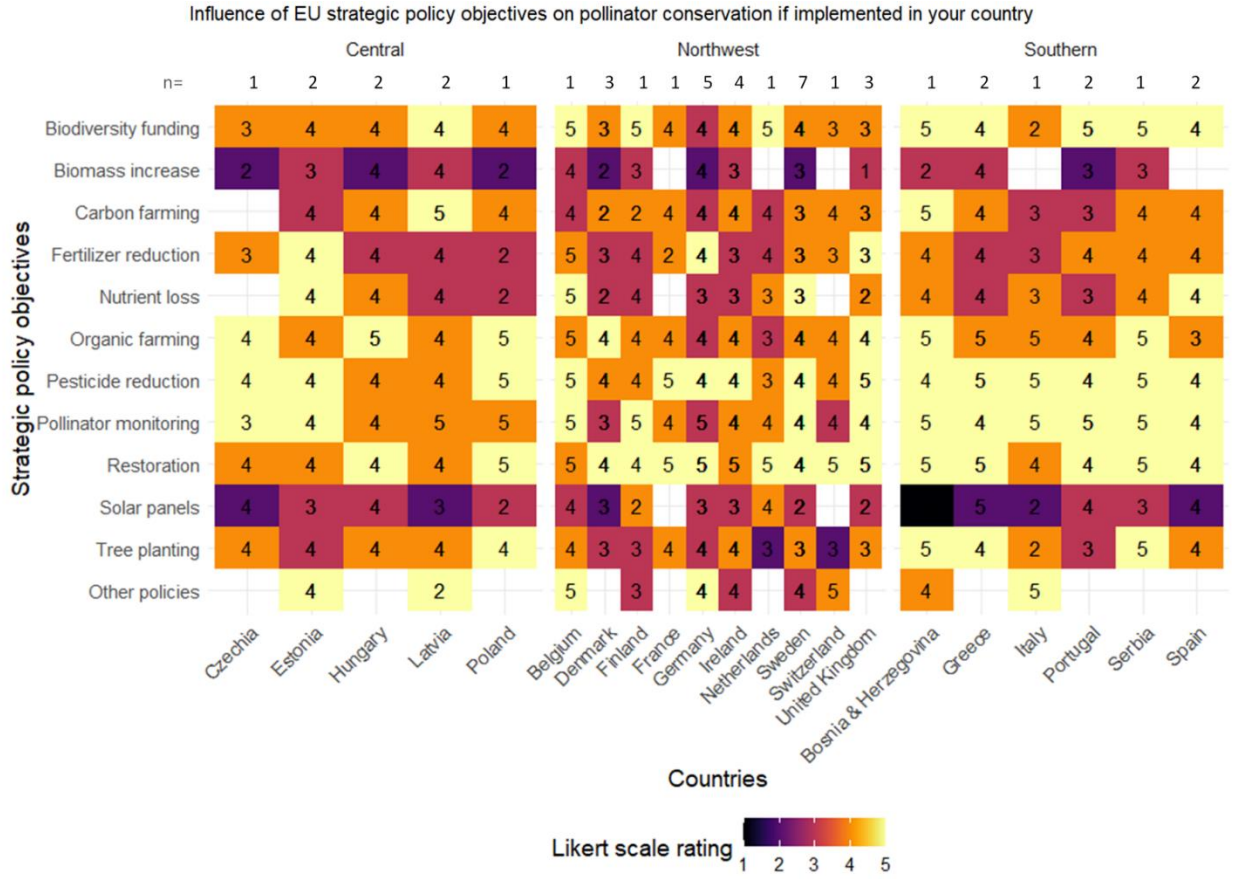

Figure 8. Assessment of the influence of strategic policy objectives by country and region with the average rating on a five-point Likert scale from 1 (very negative, black) to 5 (very positive, yellow). The certainty level of responses was also rated on a five-point Likert scale from 1 (very uncertain) to 5 (very certain) and the average certainty value by country is listed in each cell. The " n=" row indicates the total number of respondents per country.

In assessing the effects of the strategic objectives, measures and instruments, pollinator experts were asked to provide their reflection on the likely impact of the policies on a five point likert scale (from very positive to verry negative) see Appendix B. The assessed influence of the selected EU strategic policy objectives on the implementation of national pollinator conservation was highest across all regions for Restoration (mean = 4.8), followed by Pesticide reduction (mean = 4.5) and Biodiversity funding (mean = 4.4; Figure

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8). Pollinator monitoring and Organic farming policy objectives were also considered influential along with other policy options which respondents self-identified (Figure 8). These other polices included strategic land use e.g., energy production with biodiversity, inclusion of areas in Habitat and Birds directive, direct and long-term funding mechanisms through CAP, and education particularly for policymakers and land users. Both of the energy related policy objectives were rated low for their influence and the self-reported certainty of their assessments were also quite low (mean = 2.7 to 2.8). Fertilizer reduction, Nutrient loss, and Carbon farming were all similarly mixed which suggest different press-factors at the national level. Fertilizers is certainly a main issue in Denmark, but less so in Norway. This may indicate an opportunity for increased synergies with pollinator conservation for these objectives. By region, the southern region rated both the policy objectives' influence and certainty for these assessments high for Pesticide reduction, Pollinator monitoring, Biodiversity funding, and Restoration. Restoration was particularly high in the northwest region, and Organic farming was high in the central region (Figure 8).

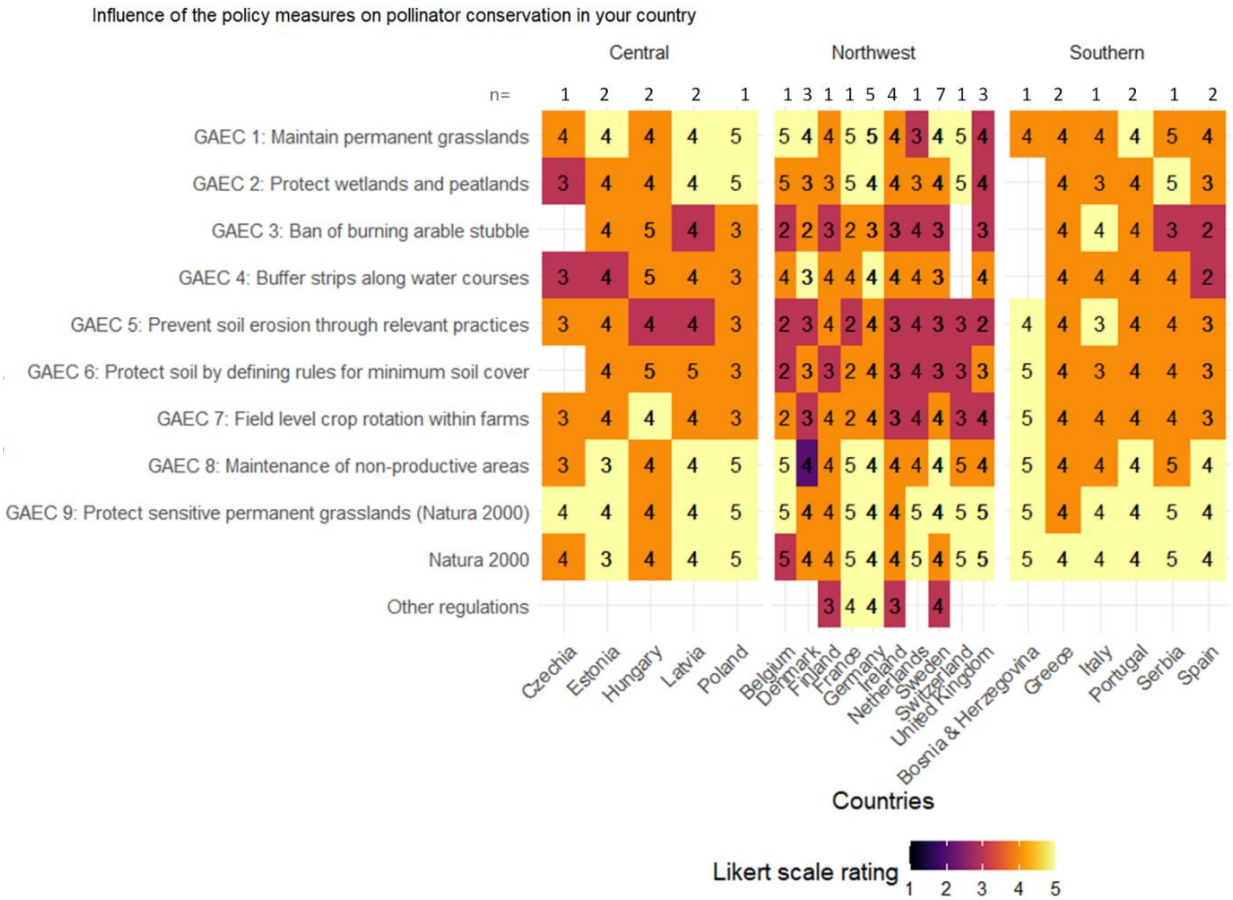

Figure 9. Expert assessment of the influence of policy measures by country and region with the average rating on a five-point Likert scale from 1 (very negative, black) to 5 (very positive, yellow). The certainty level of responses was also rated on a five-point Likert scale from 1 (very uncertain) to 5 (very certain), and the average certainty value by country is listed in each cell. The " n=" row indicates the total number of respondents per country.

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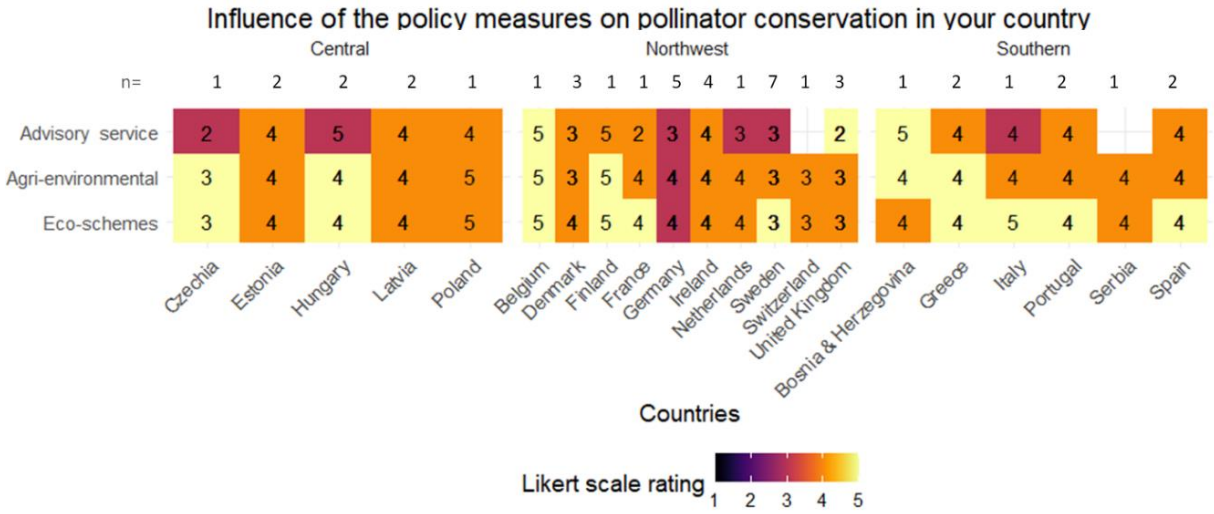

Figure 10. Expert assessment of the influence of voluntary measures by country and region with average rating on a five-point Likert scale from 1 (very negative, black) to 5 (very positive, yellow). The certainty level of responses was also rated on a five-point Likert scale from 1 (very uncertain) to 5 (very certain), and the average certainty value by country is listed in each cell. The " n=" row indicates the total number of respondents per country.

The voluntary measure of Eco-schemes was rated most highly (mean = 4.3), and Advisory services was rated the lowest (mean = 3.7) and with the highest variability of certainty (Figure 10). Eco-schemes were the most highly rated in the southern region, and Advisory service was rated the lowest in the central region.

Aside from the measures included in the question respondents were given the opportunity to indicate which measures it would be important to additionally implement to improve pollinator health. Habitat restoration and creation (mean = 4.7) was rated most highly across all regions (Figure 11). Additional highly important measures were Pollinator-friendly farming practices (mean = 4.4), Reduced pesticide use and safer alternatives (mean = 4.4), Monitoring and data collection (mean = 4.4). From a region perspective, Habitat restoration and creation was most important in the northwest and southern regions compared to the central region where Monitoring and data collection was rated most important. The northwest region included a wide heterogeneity of responses for most initiatives while the southern and central regions were generally in agreement about the importance of additional measures with the exception of Raising industry standards and Value chain initiatives which were viewed as less important.

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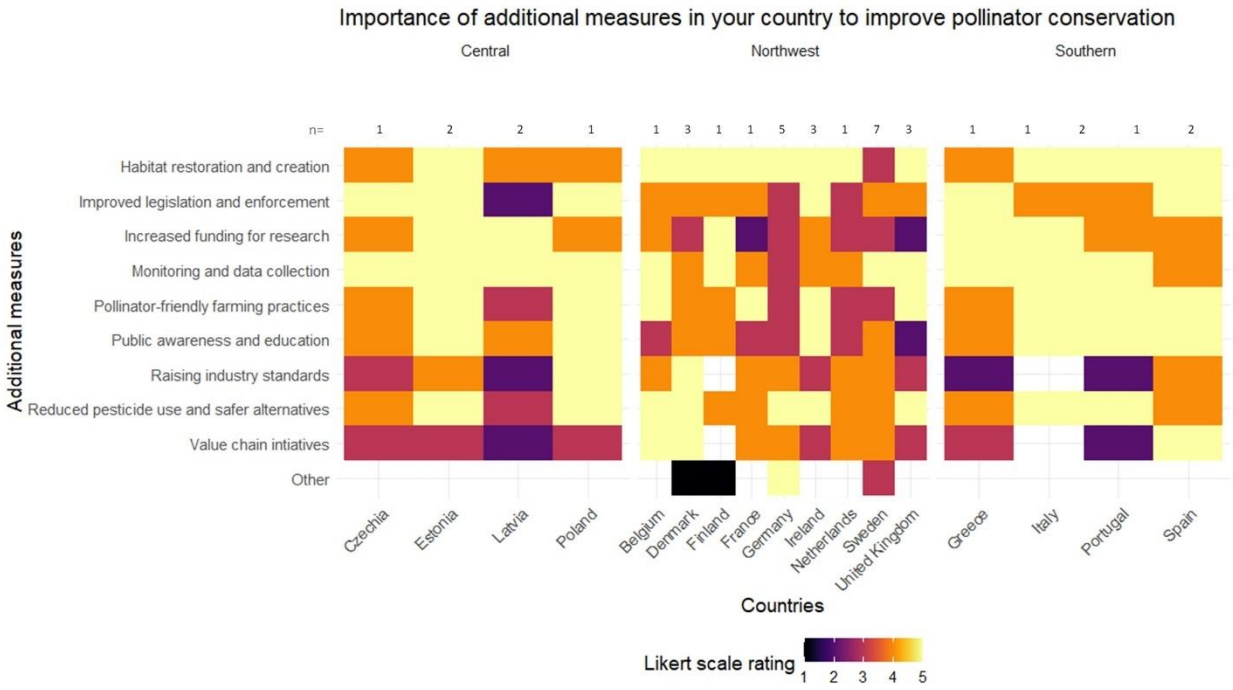

Figure 11. Expert assessment of the influence of additional measures by country and region to further improve pollinator health with average rating on a five-point Likert scale from 1 (least important, black) to 5 (very important, yellow). The "n=" row indicates the total number of respondents per country.

Overall, respondents rated CAP measures and instruments' influence on pollinators nationally as fair (mean = 2.7, median = 3); while the range was from very poor to good, no respondents rated the influence of CAP as very good (Figure 12). In the southern region, CAP influence was assessed as poor (mean = 2.3); it was slightly higher in the northwest (mean = 2.7) and still higher in the central region (mean = 3.4; Figure 13). Regarding the sufficiency of resources for national pollinator conservation, the satisfaction was even lower, rated as insufficient (mean / median = 2.0), although countries reported the full range of assessments from very sufficient to very insufficient (Figure 13). The southern region also reported the lowest resource sufficiency (mean = 1.9) compared to the northwestern (mean = 2) and central regions (mean = 2.3).

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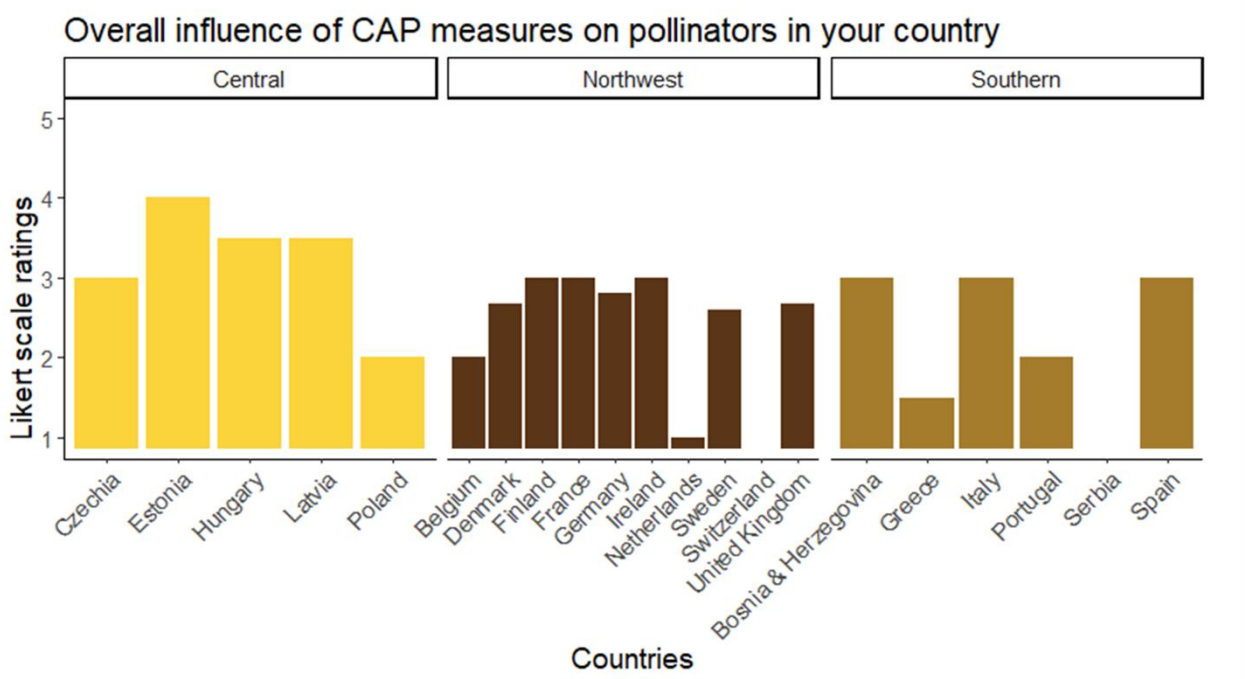

Figure 12. Expert assessment of the overall national influence of the Common Agricultural Policy (CAP) measures by country and region on a five-point Likert scale from 1 (very poor) to 5 (very good).

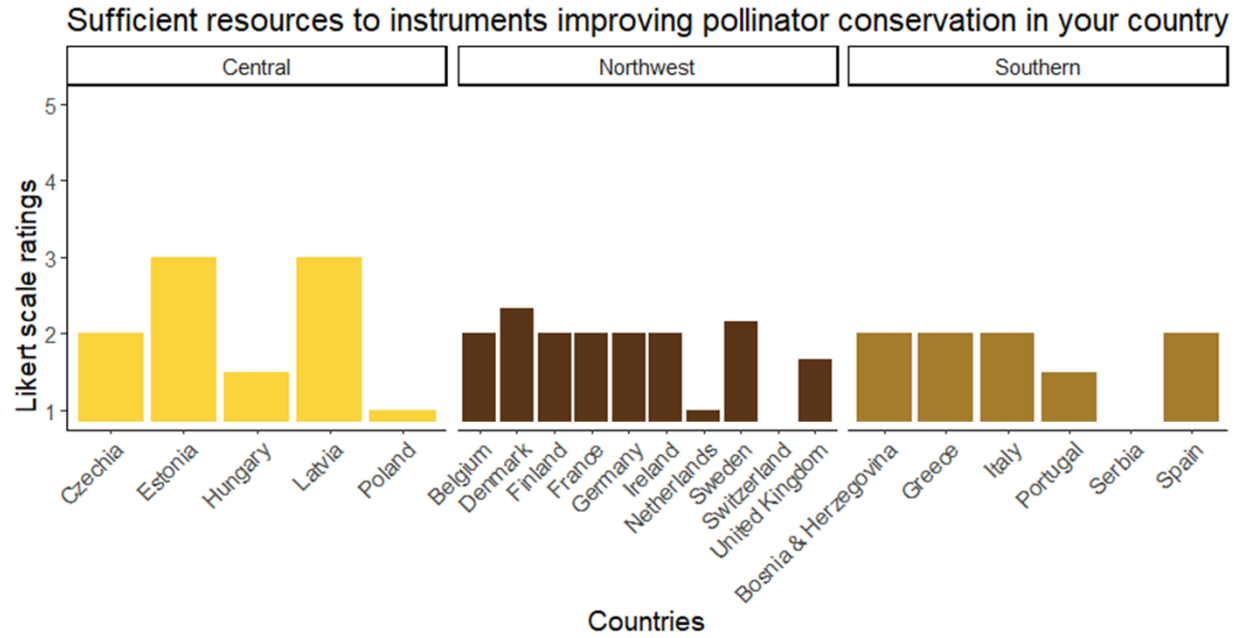

Figure 13. Resource sufficiency for national pollinator conservation by country and region on a five-point Likert scale from 1 (very insufficient) to 5 (very sufficient).

In summary, the influence of CAP and resource sufficiency for pollinator conservation could be improved, particularly in the southern region. Across all regions, habitat restoration and creation both as a strategic policy initiative and as an additional measure were highlighted by respondents as important for improving pollinator conservation. In this context, eco-schemes were seen as more important than advisory services to

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support voluntary measures. The connection between strategic policy objectives and pollinator conservation could be improved in the context of energy production (e.g., biomass increase, solar panels) and in relation to growing carbon farming initiatives. And better connecting pollinator conservation with the additional measures of raising industry standards and value chain initiatives could also be improved. From a regulatory measure perspective, grassland and particularly sensitive grassland areas like the Natura 2000 sites were highlighted as central to pollinator conservation while agricultural related GAEC could be better synergised to improve pollinator conservation.

WORKSHOP IDENTIFYING POLICY COHERENCE OF POLLINATOR POLICIES

The workshop delved into the intersection of pollinator health, restoration and European agricultural, environmental, energy, and climate policies. This section presents key barriers and enablers for the strategic objectives of the policies to address challenges for pollinators as identified and reflected upon during the workshop (see Table 3 for an overview).

Table 3: Consolidated replies regarding strategic objectives of European policy frameworks from the workshop (see Appendix C for full dataset). The three colored columns present the average values of the assessments from the survey for Northwest Europe (N), South Europe (S) and Central Europe (C), respectively, legend provided below.

Strategic objective	N	S	C	Challenges for pollinators	Improvements for pollinators
Reduce use of chemical pesticides 50% (*F2F strategy*)	4,2	4,9	4,5	International competition, resistance & perception of necessity, lobbying, farming systems depend on pesticides & lack of enforcement	Networks for pesticide reduction, buffer zones & strengthening policy implementation, compliance & interministerial dialogue
Cut nutrient losses by 50% (*F2F strategy*)	3,4	3,7	3,0	Nutrient-rich soils affecting diversity & water-protection action against nutrient runoff	Identifying trade-offs, synergies & creating a culture of austerity in chemical dependents
Reduce fertilizer use by at least 20% (*F2F strategy*)	3,5	3,6	3,7	Derogation farms & difficult to assess influence on pollinators	Assessment beyond field level & improvement of digital tools for precision farming
Increase the share of organic farming to 25% of agricultural land by 2030 (*F2F strategy*	4,4	4,2	4,0	Damaging, intensive organic farming, integrating efforts at landscape & farm-level, price-level & demand for organic food, & pollinator beneficial business models	Targeted actions for pollinators – not 'just' organic & complexity of landscapes are important for habitats
Improve C sequestration by carbon farming practices (*Soil Strategy*)	4,1	3,8	3,7	Identifying trade-offs & synergies between carbon farming & pollinator-friendly farming practices	Selecting crops bringing floral/nesting resources throughout season & weather dependent flexibility for the farmer
Install 320 GW of solar panels (*Solar strategy*)	2,6	2,4	2,8	Design and management of surrounding areas, solar companies preferring clean areas & regulation of establishment permissions	Incentives, design & management of solar parks & restriction to certain land use types

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Increase the production of biomass by 1.1 % per annum (*Renewable Energy Directive*)	2,5	2,5	1,9	Current biomass production with short rotation of crops not considered great for pollinators	Design, crop choice & management supporting pollinators
Restore at least 20% of the EU's land & sea areas by 2030 (*Nature Restoration Law*)	4,4	4,6	4,8	Governments differing in practical implementation & reluctancy of landowners due to fear of productivity loss	Mosaics of habitats across landscapes, best habitats: semi-natural grassland, shrubland, heathland & turning non-productive spaces into biodiversity hotspots
Implementation of a European pollinator monitoring scheme	4,5	4,9	4,1	Funding challenges & lack of coordination across Europe, unclear governance, resistance among farming representatives & gaps in taxonomy & knowledge	Baseline knowledge & long-time monitoring across all habitats, open standardise data sharing & transparency, species specific monitoring of threatened species & coordination with stakeholders
Double external funding for biodiversity to 7 billion euros (*Biodiversity strategy*)	4,3	4,8	4,4	Lack of public understanding of importance of biodiversity & perceived as negatively impacting economics, biodiversity not prioritised by current Commission, offsetting as source of conservation funding & support for SMEs in monitoring & restoration	Raising awareness to stakeholders, ensuring monitoring & registering more insects doesn't stop action & favouring flower rich habitats – not intensively managed organic farms
Plant 3 billion new trees before 2030 in urban areas and on farmland (*Biodiversity strategy*)	4,2	4,1	3,3	Ensuring proper species composition, planting & care for the trees, loss of semi-natural /wet grassland & multi-purpose urban trees	Inclusion of various species & baseline data for pollinator fauna
Other	4,3	4,5	4,0	Specific implementation creating uncertainties	Network & knowledge exchange improving practices, tackling conflicts with beekeepers & pollinator red lists

LEGEND

Very negative  Very positive

Reduce the use of chemical pesticides by 50% and the use of more hazardous pesticides by 50% by 2030 (Farm to Fork strategy, baseline 2018)

The F2F Strategy targets a 50% reduction in chemical pesticide use and hazardous pesticides by 2030. The key challenges identified in the workshop include international competition for food production, pesticide resistance to currently available products on the market, perceived necessity by farmers, lobbying from chemical organisations, dependency on pesticides in current farming systems, and insufficient enforcement of reduction measures.

To address these challenges, the pollinator experts suggested creating and fostering networks of actors aiming for a chemical pesticide reduction for various reasons (human health, pollinator

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health) improving access to EU policy making, governance and implementation and compliance, interministerial dialogue, and considering buffer zones with low use of pesticides around areas with high diversity of threatened species.

Cut nutrient losses by 50% by 2030 (Farm to Fork strategy, baseline 2018)

The F2F strategy aims to reduce nutrient losses by 50% by 2030. The most important challenges include that nutrient rich soils will remain nutrient rich, thus affecting the vegetation and plant composition by favouring e.g. grasses over herbs. In addition, pollinator experts pointed out that certain actions to reduce nutrient runoff into waterways potentially can be damaging to pollinator habitats, which should be avoided.

To improve considerations for pollinators, it is suggested to identify trade-offs and synergies, in relation to nutrient management adopt more precision fertilization and have a better prediction of which nutrients are needed, and build a culture of austerity in chemical dependency, which is ultimately expensive, but would lower consumption.

Increase the share of organic farming to 25% of agricultural land by 2030

The most important challenge is that intensified organic farming can be damaging for pollinators as well. Experts also pointed out that the increasing the share of organic farming are integrating efforts at landscape and farm-level, pointing out it is difficult to ensure that one activity does not impede others. Another challenge is that the price-levels of organic food is too high, which has led to a decrease in consumer demand. This also points to the challenge of creating business models that are beneficial for farming systems considering pollinators.

To improve considerations for pollinators, the experts suggest targeted actions for pollinators and not 'just' organic farming and pointed out that the complexity of the landscape is important for pollinator habitats.

Improve C sequestration by carbon farming practices (such as rewetting peatlands, cover crops, agroforestry), 42M ton by 2030 (Soil Strategy)

The biggest challenges in improving C sequestration by carbon farming practices are identifying trade-offs and synergies of carbon farming and pollinator-friendly farming practices, as well as the fact that while rewetting is valuable for some and indirectly beneficial – it only benefits few and it depends on the plant composition post implementation.

To improve considerations for pollinators, the experts suggested selecting cover crops bringing floral and nesting resources at different times of the season, flexibility for the farmers when the weather is unpredictable and making it difficult to sow at the right time. The outcome of the sequestration is dependent on the plant composition post implementation.

Install 320 GW of solar panels (~0.5-1 million ha) (Solar strategy)

The biggest challenges for pollinators in the solar strategy are designing and managing the surrounding areas for pollinators. Solar companies may prefer short grass to avoid interference with the energy production of the panels. And thus, have cleaner areas reducing bird activities (e.g. bird poo on the panels). It is a loss for the pollinators to convert semi-natural areas into PV (photovoltaic) rather than maintaining it as landscape beneficial to pollinators. Degraded landscapes and landscapes combining agriculture or nature may provide benefits. Additionally, the experts pointed out the need for regulation of permissions to establish solar parks.

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To improve considerations for pollinators, the pollinator experts suggested that design and management of solar parks should require support and enhancement of floral and nesting resources, by e.g. sowing flowers in spaces between (and under) panels. Furthermore, they suggested restricting the establishment of solar parks to certain land-use types or place them in cities, along roads, roofs, rather than on arable land replacing crops, agrovoltaic systems with both crop production and solar panels could be considered as an alternative. Experts further suggested that there should be incentives to include nesting resources in solar parks.

Increase the production of biomass for heating and cooling 1.1% per annum (Renewable Energy Directive)

The biggest challenges to increasing the production of biomass for heating and cooling seems to be that it depends on the types of crops being grown. It is all about the design, crop choice and management. Another concern is that the short rotation of crops that often do not flower cannot support pollinators. Some expressed scepticism of the biomass production, suggesting that PV + grasslands yield more energy as well as more biodiversity, thus making it more beneficial than pure biomass production.

As touched upon briefly to improve considerations for pollinators in the context of the Renewable Energy Directive, it is important to consider types of crops, e.g. providing pollinator resources, early-flowering, willow plantations which are more beneficial than mass-flowering annual crops such as sunflowers. It is also important to consider cutting frequency and the design of the biomass production systems – selection of resource material should support pollinators.

Restore at least 20% of the EU's land and sea areas by 2030 (Nature Restoration Law)

The biggest challenges are to create habitat restoration that is appropriate to the needs of pollinators, e.g. flooding of old quarries to create wetlands and lakes, versus restoring terrestrial habitats. Another concern regarded that the article devoted to agroecosystems was removed during the Nature Restoration Law negotiations, which leads to questions regarding to which extent farmland will be affected by the NRL. It is also a concern that practical implementation of the NRL differs substantially between governments. There was a concern that in some countries they experience reluctance among private landowners based on fear of productivity loss.

To improve considerations for pollinators, it was suggested to ensure mosaics of habitats across landscapes and to transform non-productive spaces into biodiversity hotspots like power line corridors, or post-industrial lands. In one country it was suggested that to restore at least 20% means that the areas need to be fractal and not clustered. Finally, it was stated that the best habitats for pollinators are semi-natural grassland, shrubland and heathland.

Implementation of a European pollinator monitoring scheme (EUPoMS, that will establish a standardised monitoring scheme across all member states following a scientific protocol)

The biggest challenges include mandatory monitoring to be carried out by individual member states. Furthermore, there is a challenge such as EU funding on recording loss rather than investing in staff to favour practice change and in some countries funding to biodiversity is cut due to change of political agendas. Another challenge is lack of coordination, there is hitherto no unified framework for monitoring across Europe, although this is under implementation. Furthermore, there are taxonomic and knowledge gaps, also unclear governance makes it difficult and creates confusion on who should take the lead. This lack of governance might be the reason behind the growing resistance among farming representatives engaging in monitoring efforts.

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Finally, monitoring in itself will not save pollinators – specific, cross-country measures are needed, but these measures are only taken if the needs are documented properly.

In line with discussions for the implementation of the EU Pollinator Monitoring System, experts suggest to improve considerations for pollinators, the experts suggested to establish long-term monitoring across all habitats and ensure baseline knowledge with high ambition on number of sampled sites. In addition, one suggests considering species specific monitoring of threatened species and make open, standardised data sharing and transparency. On a country-level, it is also important to have good coordination with land managers to ensure continuous monitoring.

Biodiversity strategy: Double external funding for biodiversity to 7 billion euros.

In terms of providing a basis for allocating funds, the biggest challenges are a lack of understanding by public of functional importance of biodiversity and supporting biodiversity is perceived as negatively impacting economics. There is a need for better support for SMEs in biodiversity monitoring and restoration. It can become an overall issue of using offsetting as a source of conservation funding. In some countries, it is a challenge to overcome the siloing between ministries managing engagement with land use. Furthermore, some mentions that biodiversity is not seen as a priority by the current commission.

To improve considerations for pollinators it is important to raise awareness to stakeholders that renting beehives is not pollinator conservation. It is important ensuring that monitoring and registering more insects does not stop action to support pollinators even though the lists of pollinators registered are increasing. Finally, it is important to favour flower rich habitats – not intensively managed organic farms.

Biodiversity strategy: plant 3 billion new trees before 2030 in urban areas and on farmlands.

The biggest challenges are ensuring proper planting and care for the trees and the composition of species is important as well. Another challenge is that more trees some places could mean a loss of open, semi-natural and wet grasslands, but it could also be former fields taken out production. Thus, it is important to focus on careful implementation, otherwise it might harm the pollinators. Lastly, it can be a challenge that trees in urban areas have different purposes, however, some trees can be beneficial to pollinators, particularly berry trees with white spring flowers.

To improve the considerations for the pollinators, it is important to include melliferous flowering and native trees in specifications of implementation such as providing resources for pollinators. Furthermore, it is important to have a precise idea of the pollinator fauna already present in areas and then aim for a march between local pollinator need and floral resources.

Other

Other objectives important to improve consideration for pollinators in relation to the biodiversity strategy includes further inclusion actors that have practices beneficial to multiple pollinators – these kinds of actors are currently underrepresented and under supported at EU-level. Furthermore, it is important to multiply networking and knowledge exchange opportunities to improve these practices. In relation to the biodiversity strategy and Natura2000 areas it is important to tackle rising conflicts with beekeepers. Lastly, creating pollinator red lists would highlight the need for action.

Improving considerations for pollinators in strategic objectives

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To improve the consideration of pollinators in strategic policy objectives at the European level, several actions are suggested by the pollinator experts in the workshop. First, integrating efforts at the landscape scale is crucial to avoid conflicting activities and promote synergies across sectors, extending beyond just pollinators. This requires a systems-level approach. Additionally, dedicating more staff to pollinators within the EU agricultural department could help bridge silos and encourage cross-departmental cooperation. Political will is also necessary to prioritise biodiversity at the EU level, with stronger networking beyond environmental departments.

The development of evidence-based, results-driven payment mechanisms and stronger protections, such as the Habitats Directive, are essential for long-term pollinator conservation. A shift in focus from pollination conservation to broader pollinator conservation would enhance protection efforts. Setting clear targets for green finance and incorporating native plants into mitigation strategies would further support these goals. Strong educational initiatives are also needed to raise awareness about pollinator and insect diversity.

Furthermore, policies should recognise the interconnections between pollinator and plant diversity, as they are easier to monitor and conserve. The NRL Art 10 can help ensure that pollinator protection is integrated across different sectors, fostering a transversal policy approach. Policies in areas like energy and agriculture should prioritize biodiversity and pollinators, aligning with the biodiversity-food-health nexus as a guiding principle. Lastly, flexibility in implementing conservation actions, such as micro-reserves for endangered pollinators, will be critical in safeguarding pollinator habitats, even in challenging circumstances.

INSTRUMENTS AND MEASURES

The workshop also assessed the key barriers and enablers of the measures and instruments employed to meet policy targets (see Table 4 for an overview).

GAEC 1: Maintaining permanent grasslands

Most important challenges with maintaining permanent grasslands are inconsistencies across EU-objectives and policies which are not favourable to farming systems working with permanent extensive grasslands. Lack of rules for how intensively permanent grasslands can be managed or grazed. There is a need for monetary rewards to change landscapes and use of land as well as highlighting the importance of quality, not quantity within landscapes. Furthermore, in southern countries, shrublands and drylands should be prioritised.

To improve considerations for pollinators it is important to ensure appropriate management plans, political support and compensation for quality. Furthermore, it is important to highlight the value of pollinator habitats to farmers and recognise their

Table 4: Consolidated replies regarding instruments and measures of European policy frameworks from the workshop (see Appendix C for full dataset). The three colored columns present the average values of the assessments from the survey for Northwest Europe (N), South Europe (S) and Central Europe (C), respectively, legend provided below.

Instrument & measure	N	S	C	Challenges for pollinators	Improvements for pollinators

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GAEC 1: Maintaining permanent grasslands	4,6	3,9	4,4	Lacking monetary rewards, grassland management rules, inconsistencies across EU objectives and policies, not taken accounts of regional contexts and priorities	Management plans & representation, conveying value, recognition, political support & compensation to farmers for quality habitats, economic viability across value chains and markets & specifying biodiversity-focused definition
GAEC 2: Protect wetlands & peatlands	4,0	4,1	4,2	Reduction of productive area by restoring/re-flooding & lacking connection between areas	Advisory on planting & management strategies & increasing areas beneficial to specific rare pollinators.
GAEC 3: Maintain SOM & soil structure	3,9	3,5	3,3	Measure already in place in DK.	
GAEC 4: Protect water from pollution through buffer strips along water	3,9	3,9	4,1	Clear recommendations on allowed species & management of habitat	Guidance on species & monetary reward for allowing natural regeneration
GAEC 5: Prevent soil erosion through relevant practices	3,7	4,3	3,2	Identifying & maintaining sites could run counter & eroding banks can be nesting sites	Synergies are possible - include flowery cover to prevent erosion adding food for pollinators at once
GAEC 6: Protect soil by defining rules for minimum soil cover	4,1	4,1	3,4	Challenging for ground-nesting bees	Allow exceptions for planting annual floral resources in perennial crops.
GAEC 7: Preserve the soil potential through field level crop rotation within farms	4,3	4,3	3,6	Marginal effect due to uniform crop rotations & productivity as well as profitability	Diverse crop rotations providing resources/landscapes for pollinators, complexity of landscape & fallow fields
GAEC 8: A place ensuring the maintenance of non-productive areas and landscape features	4,7	4,4	4,4	Requirement to devote at least 4% arable land removed & considering non-productive areas lost & use for production	Management requirements & change terminology – so areas are productive for ESS
GAEC 9: Protecting environmentally	4,9	4,8	4,8	Management rules on farmlands, nutrient &	Increased knowledge transfer to ministries,

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sensitive permanent grasslands in Natura 2000 sites.				agrochemical pollution, land use pressure, incoherent areas & lack of place-based rules	farmers & advisors & data on spatial distribution of threatened species
Designated Natura 2000 sites	4,6	4,9	4,5	Insufficient funding & allowance of honeybee hives	Knowledge sharing between ministries, farmers & advisors, wild pollinator species list for each Natura2000 site & corridors between sites
Eco-schemes	4,4	4,6	4,4	Effect depends on implementation, crop choices & habitat quality, limited farmer expertise, limited guidance available & insufficient, voluntary incentives	Prioritising long-term initiatives & and investment in good habitat management advice
Agri-Environmental and Climate Measures	4,4	4,5	4,2	Climate change, low habitat quality, limited farmer expertise, seed companies not supplying native seeds, bureaucracy & strict national regulations	Local context considerations in target measures, investment in habitat management advice

LEGEND

Very negative  Very positive

contributions to biodiversity for managing these habitats. It is important to specify a biodiversity-focused definition of permanent grassland, improve representation of farmers with permanent grasslands, and work on value chains and market making it economically viable.

GAEC 2: Protect wetlands and peatlands

Most important challenges are that a lot of measures would include restoring or re-flooding drained woodlands or fields, thereby reducing the productive areas and small areas that are not well-connected. Finally, even though it is a limitation that only few pollinators are specific to these areas, at least for the bees, these areas are not pollinator habitats to begin with, but drained areas for production.

To improve considerations for pollinators it is suggested that it is important to promote advisory work on management strategies, that does not involve cutting all the trees in an

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area at the same time, and a side note is that increasing these areas are beneficial to specific, rare pollinators.

GAEC 3: Maintain soil organic matter and soil structure through the establishment of buffer strips along water

The only comment on this measure was that the measure is already in place in Denmark.

GAEC 4: Protect water from pollution through the establishment of buffer strips along water courses

The most important challenges are identifying what species should be allowed along streams and waterbodies with clear recommendations for management that considers pollinators.

To improve considerations for pollinators, it is suggested that it is important to recommend include flowering trees or floral resources in buffer strips in addition to a monetary reward for allowing natural regeneration.

GAEC 5: Prevent soil erosion through relevant practices

The most important challenges are that steep eroding banks can be important nesting sites for ground-nesting bees, and that identifying and maintaining such sites could run counter to this strategy.

To improve considerations for pollinators, it is noted that if practices include flowery cover, you can prevent erosion and add food for pollinators at once. Synergies are possible.

GAEC 6: Protect soil by defining rules for minimum soil cover

The most important challenges are that many pollinators, i.e. ground-nesting bees, need bare soil to nest, thus this measure could be either good or bad depending on the context. In vineyards or agroforestry, it creates a challenge in perennial crops for those who want to plant annual floral resources in between rows.

To improve considerations for pollinators, it is suggested to allow exceptions for planting annual floral resources in perennial crops.

GAEC 7: Preserve the soil potential through field level crop rotation within farms

The biggest challenges to this measure are that current crop rotations are not diverse, so the effect is marginal, also moving away from traditional ploughing systems may reduce available area for ground-nesting bees. Lastly, it is a challenge to get these diverse crop rotations productive and profitable for the farmers.

To improve considerations for the pollinators with this measure, it is important to incorporate ambitious, incentivised, diverse, flowering crop rotations as they can provide more resources and landscapes for pollinators and include a fallow field.

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GAEC 8: Maintain non-productive areas and landscape features, and ensure the retention of landscape

The most important challenges are that dominant world views in agri-networks at EU-level consider non-productive areas as lost and as ones that should be used for production. However, the quality of non-productive areas is key for pollinators. Furthermore, the requirement to devote at least 4% arable land at farm-level to non-productive areas or features under the CAP was removed in 2024, as it became an eco-scheme.

To improve considerations for pollinators, it is suggested to include management requirements to enhance resources for pollinators and change the terminology and say that these areas are productive for ecosystem service and that it is essential to safeguard rare species habitat resources. Finally, it is suggested that it will be more effective if done both at field and landscape level, which potentially could be collective measures for groups of farmers.

GAEC 9: Protecting environmentally sensitive permanent grasslands in Natura2000 sites

The most important challenges in this measure are pollution such as nutrients and agrochemicals from surrounding areas, and the fact that management rules on farmland do not always benefit pollinators in terms of increasing floral resources. Furthermore, the areas can be small, isolated, and in some countries, there is a strong pressure to use the land. In other countries there is shortage of grazing in remote areas, and grasslands need to be worked on, which is best done with large grazers like cattle. Finally, it is noted that grassland challenges do not apply across all of Europe, most dominated in northern countries.

To improve considerations for pollinators, it is important to have good data on the spatial distribution of threatened species and to increase transfer of knowledge to ministries, farmers and advisors.

Designated Natura2000 sites

The most important challenges include insufficient funding and resources, which affects monitoring and efforts of restoration. Furthermore, management rules on farmland do not always benefit pollinators in terms of floral resources, and the allowance of keeping honeybee hives in the area stress wild pollinator dynamics. However, preserving the existing natural areas of any size is the absolute best action to protect pollinators, including rare, vulnerable species.

To improve considerations for pollinators in Natura2000 sites, it is important to increase knowledge sharing between ministries, farmers and advisors, make a list of wild pollinator species for each Natura2000 site, and put an emphasis on creating dispersal corridors between sites.

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Eco-schemes (voluntary environmental measures under the CAP that provide financial incentives to farmers for adopting sustainable farming practices that benefit the environment and biodiversity)

The most important challenges are that habitat quality is often poor and that there is limited guidance available along with low farmers' expertise in habitat management. The eco-schemes are voluntary, so they need to be encouraged, and the incentives must be greater for uptakes. It is a challenge creating a sustainable payment for farmers to implement eco-schemes, and currently it is too bureaucratic and therefore farmers do not apply.

To improve considerations for pollinators, it is suggested to invest in good habitat management advice, and maybe even make it a requirement. Currently, it is mostly annual initiatives, and it would be better to prioritise longer-term initiatives to get a better effect.

Agri-Environmental and Climate Measures (policies under the CAP that provide financial support to farmers for adopting farming practices that protect the environment, mitigate climate change, and promote sustainable land management)

The most important challenges are that habitat quality is often low, and farmers have limited expertise in habitat management. It is also a challenge that seed companies do not always supply appropriate native seeds. Furthermore, some countries experience too much bureaucracy and strict national regulations, and there is not much support for good, new farming practices. Finally, climate change is a strong driver of pollinator decline, which means that every measure we can take to mitigate climate change is good for pollinators.

To improve considerations for pollinators, target measures need to incorporate local contexts and invest in habitat management advice.

Improving the considerations for pollinators in instruments and measures

To improve the consideration of pollinators in the available instruments and measures across Europe, workshop and open survey comments indicate several key steps which are needed across regulatory initiatives, support programs, and advisory systems.

Regulatory Initiatives: First, better metrics for measuring biodiversity, such as Essential Biodiversity Variables (EBVs), are critical for guiding policy and business decisions. The full diversity of pollinators, beyond just common species, must be considered in conservation efforts. A fast-response system to protect areas critical for pollinator diversity is necessary, alongside robust nature protection regulations.

Support Programs: Current programs often focus more on vertebrates than invertebrates, so there is a need to shift emphasis to pollinators. Training for farmers is crucial, including expanding pollinator and biodiversity education in programs like Ireland's Green Cert curriculum. Species conservation programs should prioritize creating self-sustaining habitats over short-term habitat restoration, ensuring the long-

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term success of umbrella species. Besides, more support for bottom-up, pollinator-friendly initiatives among farmers is needed, as well as explicit inclusion of pollinators in eco-schemes. The National Resilience and Recovery Plan (NRL) should be operationalized to further support these efforts.

Advisory Programs: At the EU level, advisory support should be expanded to ensure effective knowledge transfer and implementation. There should be EU-wide standards for biodiversity data collection and consistent follow-up and refinement of actions to ensure effectiveness, as some measures may have unintended negative effects. Advisory boards could help assess new knowledge and fine-tune policies. It is also critical that agricultural departments and their advisory programs actively support the promotion of ecosystem services by wild pollinators on farmland. Independent farmer extension services are essential for this process.

Discussion

This section summarises the key points from the scoping of policies, survey and workshop identifying synergies, trade-offs and gaps in current European policy architecture.

SYNTHESIS OF FINDINGS

The following section is divided into eight smaller sections according to the environmental factors initially selected as a basis for the analysis to assess the impact of EU policy frameworks on pollinators

Land cover and configuration

Overall land cover and configuration of land-use systems is an aspect that is frequently reflected in EU policy frameworks, with several policies setting conditions for land use, including resource intensive policies like the CAP and Habitats and Birds directive. Furthermore, if fully implemented, the NRL may potentially have a significant influence on land use patterns, particularly in countries with intensive agricultural land use. The expert survey further documents the perception of a negative impact on pollinators of some policy objectives such as increasing biomass production and raising solar panels, while featuring a more positive impact of dedicated efforts such as investments in biodiversity and nature restoration. Concerning biomass production and raising solar panels, workshop perticipants highlighted the potenatial risks of conversion of semi-natural habitats to implement the objectives as an important .

Habitat loss and fragmentation are major drivers of pollinator decline, as they isolate pollinator populations and reduce the availability of foraging and nesting sites across space and time (Foley et al., 2005). Restoration was preferred as the most important measure to address this pressure according to the expert survey - a finding that falls in line with Pe'er et al. (2022) that identified semi-natural areas and extensively managed areas as the most critical elements for broader farmland biodiversity conservation across Europe.

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With respect to policy trade-offs and synergies, several aspects are important to consider. Land use changes, such as the installation of solar panels, can have both positive and negative effects on pollinators, depending on how the solar infrastructure is managed and integrated into the surrounding environment, as well as the nature of the landcover that is replaced (Blaydes, Potts, Whyatt, & Armstrong, 2021). Positive effects include the potential creation of new pollinator habitats and reduced pressure from intensive agriculture, while negative effects include fragmentation or destruction of existing natural habitats and potential disturbance of pollinators by the reflection of light from the panels (Blaydes et al., 2021; Dolezal, Torres, & O'Neal, 2021; Graham et al., 2021). Furthermore, the Solar strategy and SFRD indicate that when it comes to policies and the impact of policies on pollinators, impact pathways are highly complex. E.g training personnel and providing conditions for sustainable investments, which are pursued in these frameworks, have a direct impact on land cover and configuration, and thus ultimately pollinators. Furthermore, the context of each individual country also has an important influence on how the experts assessed policy objectives, e.g. the potential effect of the three million tree pledge of the biodiversity strategy is overall rated quite positive across counties with little forest area and regarded less favourably in southern countries with potentially damaging effects of climate change such as in South Europe, and conversely assessed less favourable in more forested regions.

Land cover management

In terms of land cover management, a number of key EU policies are designed specifically to influence land management and the particular practices adopted by land users.

The Farm to Fork strategy encourages a shift towards organic farming and agroecological practices, with the target to increase organic farmland to 25% of the total agricultural area by 2030. Since organic farming methods often involve less intensive land cover management, increased plant diversity, and the absence of synthetic pesticides and fertilizers, these are seen as contributing to richer, more diverse habitats for pollinators (Gabriel, Sait, Kunin, & Benton, 2013). The objective of promoting organic farming implicitly advocates for a land use which provide habitat for species that cannot cope with intensive agricultural landscape. Such, often traditional, uses of more or less wooded grasslands, maintains habitats and ecosystem services that make landscapes attractive also for outdoor recreation and tourism (Plieninger, Van der Horst, Schleyer, & Bieling, 2014). The survey documents that generally organic farming is assessed to have a moderately positive impact on pollinators, although there are also trade-offs. While organic farming systems are generally thought to be beneficial to pollinators (Gabriel & Tscharntke, 2007; Power & Stout, 2011). The workshop participants highlighted that the less intensive food production of organic farming systems requires more land, and results in higher food prices, while the reliance on intensive mechanical weeding of some organic farming systems can also have negative effects on certain species of pollinators. This highlights the importance of a systemic approach to assessing the effects of land use management.

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Agroecological practices, such as cover cropping, crop rotation, agroforestry, and hedgerow planting, further enhance habitat heterogeneity and provide continuous foraging resources, which are essential for maintaining healthy pollinator populations (Image, Gardner, & Breeze, 2023; Tscharntke et al., 2012). Research has also shown that organic farms can host higher densities and diversity of pollinators due to the availability of floral resources and nesting sites (Holzschuh, Steffan-Dewenter, Kleijn, & Tscharntke, 2007). However, concerning an increase of organic farming in Europe, the European Court of Auditors, for instance, find that there are gaps in the strategic framework of the EU policy for the organic sector (ECA, 2024). Targets for the organic sector are non-binding. Besides, they only focus on increasing the area, but a broader strategy for supporting the transition to organic farming currently lacks considerations of transforming dominant value chains and markets. The workshop also pointed to some of the uncertainties of novel practices such as carbon farming, where for the moment knowledge gaps exist.

In general, the CAP is one of the most influential policies on the intensity of agricultural production. E.g. Reif et al. (2024) showed that the intensity of agriculture in seven countries that entered the EU in 2004 and 2007 increased after the accession. Overall, respondents assess the CAP to have a neutral effect on conditions for pollinators (although a third notes that it is poor or very poor), while generally respondents note that resources available for the protection of pollinators is insufficient or very insufficient (74%). Reif et al. (2024) This suggests that the adverse impacts of agricultural intensification overrode the possible benefits of EU policy measures aimed at supporting biodiversity. However, the CAP also serves to maintain traditional cultural landscapes sustaining meadows, pastures and wooded grasslands throughout Europe in the face of market pressures (e.g., Portugal (Pinto-Correia, Muñoz-Rojas, Thorsøe, & Noe, 2019). Such habitats are crucial for pollinators and farmland birds, and for providing opportunities for rural jobs focusing on tourism and outdoor recreation, thus providing a range of eco-system services along with protection of wild pollinators.

The CAP, including the requirements for conditionality, eco-schemes and voluntary AECM, represents an important policy for land use management. Concerning the GAECs, particularly requirements to maintain non-productive elements, and to protect extensive grasslands, are generally assessed to be highly positive for pollinators by the surveyed experts. Non-productive elements include solitary trees, stonewalls, mounts, hedgerows and field margins under GAEC 8, and these are potentially important as pollinator habitats and feed resources (Cole et al., 2020). Further GAEC 1, 4, 8 and 9 ensure the maintenance of permanent ground cover, including grasses and flowering plants. However, ensuring permanent ground cover also illustrates an important trade-off, particularly with respect to soil cover requirements, which may be both positive and negative depending on the species. Further, Schils et al. (2022) report that permanent grasslands cover 34% of Europe, which has a positive effect on pollinators, although also under threat due to intensification. Besides, although wetlands and peatlands are damp habitats, which are generally not deemed valuable for bees, these provide important resources for hoverflies,

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and thus GAEC 2 may have a positive impact on these species (Cole et al., 2020; Heneberg, Bogusch, & Astapenková, 2014).

The survey generally assesses CAP Eco-schemes and AECMs moderately positive. Yet, the workshop highlighted several shortcomings, including the lack of incentives for their uptake and limited knowledge and available guidance on habitat management. This may result in less optimal implementation of the measures.

Presence and movement of honeybees

Aside from the EU Bee Health Regulation , which is concerned with preventing diseases and regulating the movement of bees to ensure their health, and the EU Pollinators Initiative, which works on a wider set of issues, such as habitat preservation and the reduction of pesticide use that affect honey bees and other pollinators, no other EU policy initiatives that influence the presence and movement of honey bees were identified neither by the study team not by the experts via the survey or the workshop.

Pesticides and agrochemicals

Regulating the use of pesticides is an important component in ensuring pollinator health (Dicks et al., 2016) and one of the primary objectives of the Farm to Fork strategy, which proposes to reduce the use of chemical pesticides by 50% by 2030. Pesticides, especially insecticides, have been shown to adversely affect pollinator populations, contributing to declines in bees, butterflies, and other pollinating species due to their toxic effects on these organisms (Goulson, Nicholls, Botías, & Rotheray, 2015). By reducing pesticide use and encouraging integrated pest management (IPM) practices, the strategy directly decreases exposure to harmful chemicals, fostering safer environments for pollinators across Europe (Potts et al., 2016). Additionally, the strategy promotes the use of biocontrol methods as alternatives to chemical pesticides, which are generally less harmful to pollinators and can help stabilise their populations in agricultural landscapes (Kremen & Miles, 2012).

EUs Chemicals Strategy for Sustainability aims to mitigate these risks by banning the most harmful chemicals, with a focus on protecting pollinators and broader ecosystem resilience (EC, 2020a). Among the key tools for this strategy are the review of annexes in the Environmental Quality Standards Directive and the Groundwater Directive, which are used to reassess and regulate the impact of pesticides, pharmaceuticals, PFAS, and metals. While these measures target the reduction of harmful chemical exposure, their complexity remains a challenge, particularly in determining which chemical uses are deemed "essential" for society. Comprehensive research on the impacts of this strategy on biodiversity and pollinator health is still needed. Further, given the withdrawal of the Regulation on the Sustainable Use of Plant Protection Products (The Pesticide Reduction Act), currently, there are significant uncertainties as to how the goal of a 50% reduction of pesticide use should be achieved.

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The expert survey documented that reducing the use of pesticides was generally considered by experts to have a very positive impact on pollinator health. Workshop participants further stressed that international competition in the food market and resistance to pesticide reduction and perception of necessity of pesticide use among land users are among the important hindrances to achieving such reductions.

In the case of insecticides, there exists self-evident potential for off-target harm to pollinating insects, but even when insects are not the target–as in the case of fungicide and herbicide use–they may be directly or indirectly affected, both by the active and putatively inert of substances (Mullin, 2015; Reshi et al., 2025; Sponsler et al., 2019). Further, knowledge gaps still exists with respect to systemic and wider ecosystem effects of pesticide use and further the specific impact of some groups of pesticides and effects on some species is also unknown (Basu et al., 2024). The Chemicals Strategy for Sustainability has the potential to positively influence pollinator health by banning the most harmful chemicals and reducing environmental pollution, thus contributing to a more secure environment for these essential species. However, the full impact of this strategy on biodiversity and ecosystem health remains under investigation, and ongoing efforts are crucial for understanding and mitigating potential risks to pollinators.

Additionally, the Chemicals Strategy for Sustainability promotes monitoring of and testing of substances, ensuring regulatory frameworks remain responsive. There is a growing call for increased transparency in pesticide regulation, particularly regarding the public availability of studies supporting pesticide registration (Sgolastra et al., 2020). This has been underscored by the neonicotinoid controversy, which revealed significant gaps in regulatory responses. Moving forward, the experience with neonicotinoids should inform revisions to bee risk assessment frameworks, encouraging proactive regulatory revisions and stronger protections for pollinators.

Regulatory initiatives

Although several policies that were reviewed for the report have a direct influence on pollinators, this influence is often not considered in the policy design. E.g. the survey demonstrated that the conditionality of the CAP and the Habitat and Birds directive are assessed to have a positive impact on pollinators across Europe, but such effects are not considered in the policy design. Further, improved legislation and enforcement are assessed to be important for further improving pollinator health, particularly by the surveyed experts in the Southern and Central Europe.

The workshop further highlights that, to protect pollinator diversity, rapid measures securing areas critical to biodiversity are essential. Biodiversity conservation should be prioritised, with flexible approaches like micro-reserves to protect small habitats for endangered pollinators. However, the lack of a streamlined framework for such targeted conservation actions hampers progress.

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This falls in line with several European and international assessment that there is an insufficient regulatory basis for pollinator conservation, and that a transversal approach where policies across sectors align to achieve conservation goals is needed (IPBES, 2017). The European Commission has made a similar observation as the basis for the adoption of the revised Pollinator Initiative (EC, 2023). Variations in regulatory and conservation efforts among EU MSs further undermine collective action, with some countries adopting stricter pesticide controls while others lagging behind (EC, 2023).

Voluntary measures

Concerning voluntary measures for pollinator protection under European policies, these are deemed to face significant challenges, with limited success in halting the decline of pollinators (or biodiversity loss in general). Changes introduced in the new CAP (regulatory and voluntary components) remain disproportionately small compared to the scale of biodiversity decline (Pe'er et al., 2022). Further, due to the wide freedom for MSs in their domestic implementation, national priorities can hinder the achievement of the foreseen objectives, e.g. if a country decides to implement only basic measures (Moldoveanu et al., 2024).

In terms of adoption of relevant measures, the voluntary nature and lacking consideration of land user motivations in scheme design often hinder the uptake and environmental effectiveness of such measures (Brown et al., 2021; Hasler et al., 2022). This is because many measures focus on managed species, such as honeybees, or are integrated into broader biodiversity schemes rather than being tailored for diverse pollinator needs (Batáry, Dicks, Kleijn, & Sutherland, 2015). To enhance effectiveness, policies must offer greater incentives and support for bottom-up, farmer-led initiatives, operationalise the National Reference Levels (NRL) with explicit inclusion of pollinators in eco-schemes, and ensure the availability of independent farmer advisory services. These steps would address the broader challenge of relying on voluntary measures, which often lack the necessary specificity, enforcement, and reach to make substantial contributions to pollinator conservation.

Information and advise

Across Europe, the survey documented that experts had a moderately positive evaluation of the advisory services in promoting pollinator conservation efforts. In general, advisory services vary significantly in structure, resources, and effectiveness due to regional differences in governance, funding, and stakeholder engagement (Klerkx, van Mierlo, & Leeuwis, 2012; Knierim et al., 2015). Countries in Northwestern Europe benefit from well-established and integrated knowledge networks (Agricultural Knowledge and Innovation Systems, AKIS) that facilitate strong collaboration between researchers, advisors, and farmers, while Southern and Eastern Europe face challenges such as limited resources, weaker advisory services, and fragmented knowledge transfer systems (Knierim & Prager, 2015). Workshops further stressed that independent advisory programmes are a key enabling factor for successful initiatives promoting pollinator health. Advice is relevant

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on different levels of decision-making, including reduced pesticide use, facilitating habitat restoration, and pollinator-friendly farming techniques. Independence (from commercial interests such as input providers) is stressed as an important factor, and further the value of the ESS provided by wild pollinators to commercial crops should be better communicated to land users for improved consideration.

Monitoring

In both workshop and survey, pollinator monitoring was emphasised as a key foundation for improving pollinator health across Europe. Improving knowledge of pollinator decline, including documenting its extent, causes and consequences, is a domain featuring important shortcoming across the world as well as in Europe (Dicks et al., 2016; Potts et al., 2024). Enhanced monitoring and data collection will thus be critical to adapting and refining policies that support pollinator health under changing environmental conditions (IPBES, 2018). Currently, significant gaps in monitoring and research impede informed policymaking. Establishing standardised and mandatory monitoring protocols across MSs is crucial.

Monitoring is particularly challenging when it comes to pollinators due to their wide distribution and the diverse taxa; most pollinator species are considered data deficient, and their decreasing trends could be even more serious than so far considered (Moldoveanu et al., 2024; Nieto, 2014). Using proxy data such as plant diversity (flowers) is emphasised in the workshop as a guideline of pollinator supporting activities.

It is important to note that pollinator monitoring alone cannot halt their decline because it only provides data on population trends without addressing the root causes, such as habitat loss, pesticide use, and climate change (IPBES, 2017). Effective conservation requires integrating monitoring with concrete policy measures, habitat restoration, and sustainable agricultural practices to mitigate these threats (EU Pollinators Initiative). Furthermore, monitoring programmes often lack the funding, coverage, and standardisation needed for meaningful action across diverse regions (Pe'er et al., 2022).

INTERNATIONAL PERSPECTIVES

Pollinators are not only threatened in Europe - pollinator populations are apparently experiencing declining numbers also in other continents. Following the IPBES Global Assessment of Pollinators (IPBES, 2017), a number of countries began developing dedicated pollinator strategies. This section gathers a few perspectives from across the globe concerning how the existing challenges to pollinator conservation are addressed.

In China, pollinators are threatened by a combination of land use changes, emphasising monocropping and massive pesticide use. However, few bee species are included in national Red List of threatened pollinators, which could serve as a basis for establishing cross-regional nature reserves to protect habitats and migratory passages (Ma, Wang, Zhang, Cui, & Xu, 2022). Improving monitoring and raising awareness among researchers, farmers, policymakers and the general public is seen as an important foundation for

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further ensuring the success of conservation efforts (Tian, Lan, Xu, Li, & Li, 2016). However, thus far, no concerted national pollinator conservation policy that safeguards pollinator diversity has been agreed upon, particularly with respect to wild pollinators and pollinator habitats (Olhnuud, Zhang, & Liu, 2023).

In the USA, in June 2014, President Obama issued a memorandum establishing a Pollinator Health Task Force, co-chaired by USDA and EPA, to create a National Pollinator Health Strategy that promotes the health of honeybees and other pollinators (including birds, bats, butterflies, and insects) (Hall & Steiner, 2019). The taskforce experienced mixed results - while awareness and restoration efforts were initiated, regulatory changes were slow, and sustaining funding and long-term interagency coordination proved difficult. However, a number of initiatives were passed at state level, addressing a wide array of pollinator challenges, including pesticide regulation and restoration efforts. Subsequently, various initiatives to improve roadside habitats was agreed under the Infrastructure Investment and Jobs Act (2021), key activities include planting native vegetation and modifying mowing practices to protect pollinators (Moore et al., 2023). Further, in relation to conservation, $25 million under the Wetland Reserve Enhancement Partnership was allocated to the restoration of pollinator habitats focusing on ecosystem health.

In Australia, pollinator restoration is supported by a combination of national strategies, state-specific policies, and targeted conservation programmes. The Australian Pollinator Strategy project, a five-year work that was launched in late 2024 (APS, 2024), will be the most direct policy addressing pollinator conservation, while other established initiatives like the Threatened Species Strategy (AG, 2021) (2015; superseded by the Threatened Species Action Plan 2022-2032) and the National Landcare Programme (and the subsequent Environmental Stewardship Programme) already play a significant role in enhancing pollinator habitats and ensuring their health. The Australian National Wildlife Corridors Plan, launched by the Australian government back in 2012 to retain, restore and manage ecological connections in the Australian landscape, stipulates the creation of wildlife corridors with an aim of connecting fragmented habitats, which is essential for the movement and survival of pollinators as well as other species (AG, 2012).

Further a number of other countries in Latin America, including Brazil (Hipólito, Coutinho, Mahlmann, Santana, & Magnusson, 2021) and Chile (Vieli et al., 2021) are also report a number of challenges concerning pollinator protection strategies. These include, conflicting opinions and lacking knowledge among legislators and scientists, perhaps due to lack of knowledge on both sides. Further, a general lack of data and monitoring programs that can provide evidence of their conservation status and contribution to crop yields.

Conclusion

The objective of the report was to identify, assess and compare EU policies that have direct and indirect effects on pollinator restoration.

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In the report we highlight the inconsistencies between the ambitious goals of European pollinator restoration policies and their actual implementation and performance. Although the protection of pollinators is recognized as an important priority, few dedicated policies are developed in response and mostly regulatory initiatives are avoided. While overarching frameworks such as the European Green Deal, the Farm-to-Fork Strategy, and the Biodiversity Strategy for 2030 provide critical guidelines for environmental sustainability and pollinator health, policy coherence remains a key challenge. Fragmentation across sectors (agriculture, energy, environment, and climate) hinders the successful development and implementation of initiatives promoting pollinator health.

The survey shows that experts identified habitat restoration and pesticide reduction as the most influential objectives for pollinator health, particularly in southern and central regions of Europe. Particularly the upcoming Nature Restoration Law holds a great potential to improve conditions for pollinators in a long-term perspective. However, experts also noted gaps in monitoring systems, insufficient funding, and low uptake of voluntary measures due to bureaucratic hurdles and inadequate incentives. Policies related to fertilizer reduction and nutrient loss were seen as underutilised opportunities for creating synergies with pollinator protection. Experts emphasised the need for improved coherence, stronger implementation, and targeted actions across regions.

The workshop further highlights barriers to action, including the lack of coherence across policy sectors along with conflicting priorities and insufficient enforcement mechanisms. Experts emphasised that pesticide reduction, habitat restoration, and nutrient loss mitigation goals under initiatives like the Farm to Fork Strategy require better integration and support. Improved monitoring, targeted incentives, and enhanced collaboration between stakeholders were highlighted as critical steps to address these challenges and achieve more effective pollinator protection.

In conclusion, achieving pollinator restoration in Europe requires not only ambitious policy goals, but also improved governance, monitoring, and implementation to bridge the gap between promise and performance and secure resilient ecosystems for future generations.

Appendix A: Template for characterisation of policies

Name of policy	
Objective	What is the objective of the policy of relevance to pollinator health, restoration or pollination services? *Please provide a short description of the objective of the policy 100-200 words. If the policy contains multiple objectives, please detail which part of the objectives is relevant for pollinators.*
Actions	What are the actions that are adopted in pursuit of the stated objectives?

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<table>
<tr><td></td><td colspan="4">Please provide a short description (200-400 words) of the actions that are adopted in pursuit of the policy objectives. The more specific we can be here the better, so if a particular amount of funding is allocated or a number of ha is specified as a target, then it would be great to add here. Please also consider if policies have a specific geographical focus or influence specific threats to pollinators.</td></tr>
<tr><td>Governance level</td><td colspan="4">On which level of governance are actions implemented (EU, National, regional or farm scales)?</td></tr>
<tr><td>Implications</td><td colspan="4">How will the actions likely influence the environmental factors selected for the analysis?
Please tick the boxes where the actions will cause a change to the specific environmental factor (e.g. will land use be changed in a way that is helpful or harmful to pollinators and pollination services).</td></tr>
<tr><td></td><td>Indicator</td><td>Direct impact</td><td>Indirect impact</td><td>Not mentioned</td></tr>
<tr><td></td><td>Land cover and configuration</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Land cover management</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Presence and movement of honeybees</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Pesticides and agrochemicals</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Economic support for pollinator protection</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Knowledge availability and use</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Monitoring programmes</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Regulation</td><td></td><td></td><td></td></tr>
<tr><td></td><td colspan="4">Elaboration: Here, please detail the nature of the interaction (<200 words) in case it is indicated as positive or negative. In case you have noted a positive or negative influence on pollination or pollination services, please provide a reference or two to substantiate your argument.</td></tr>
<tr><td>Additional info</td><td colspan="4">If you come across anything that is relevant for the groups reflection regarding the effect of the policy.</td></tr>
</table>

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Appendix B: Survey for pollinator experts

Appendix B contains the survey that was distributed to European pollinator experts.

Introduction

As a part of a group of 40 European experts on pollinators and biodiversity, we invite you to take part in this survey that evaluates the effects of European policies on pollinators and seeks to identify shortcomings and opportunities for improving the consideration for pollinators in existing European policy frameworks. Below, you will find a detailed description of the inquiry.

Why Is This Important?

Pollinators and pollination services across Europe face significant pressures, threatening biodiversity, food security, and ecosystem health. European policies on agriculture and nature are critical for reversing these trends. This survey's findings will contribute to advising policymakers at both European and national levels. Notably, as preparations for revising the Common Agricultural Policy (CAP) are underway, your input will inform opportunities to enhance conditions for pollinators.

The survey is divided into two sections:

Section 1: Assess the impact of overarching European policy objectives on pollinators.

Section 2: Evaluate specific policy measures.

Each section includes an introductory explanation. We do not expect you to have a detailed understanding of every European policy; instead, your expertise will enrich our collective assessment.

Confidentiality: Please note, your reply will be treated with strict confidentiality. Your replies will only be used for research purposes and your identity will not be disclosed in any form. All data acquisition, processing and storage is carried out according to the General Data Protection Regulation (GDPR) of the European Commission, see further details here. By ticking the box below, you consent to our use of your data for research purposes.

(1) ❑ I consent, my responses can be used as data for research purposes

Withdrawal: You may withdraw from the survey at any time by notifying us in writing before December 20th, 2024. If you choose to withdraw, your data will be permanently deleted.

Section #1: Background information

Initially, we would like to know a bit about you and your background.

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What country do you currently work in?

(10) ❍ Belgium

(1) ❍ Bosnia & Herzegovina

(2) ❍ Bulgaria

(4) ❍ Czechia

(6) ❍ Croatia

(5) ❍ Cyprus

(7) ❍ Denmark

(8) ❍ Estonia

(11) ❍ Finland

(9) ❍ France

(12) ❍ Germany

(14) ❍ Greece

(13) ❍ Hungary

(15) ❍ Ireland

(16) ❍ Italy

(17) ❍ Latvia

(18) ❍ Malta

(20) ❍ Netherlands

(19) ❍ Norway

(21) ❍ Poland

(26) ❍ Portugal

(23) ❍ Serbia

(25) ❍ Spain

(22) ❍ Sweden

(24) ❍ United Kingdom

Gender

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(2) ❍ Male

(1) ❍ Female

(3) ❍ Other

Title and field of research

_____

How many years have you worked with pollinators and/or biodiversity?

_____

Which organisation do you work for?

_____

Section #2 Synergies with strategic objectives

In the first step of our analysis, we screened a broad set of European policies for objectives that may influence pollinator conservation. Our focus was on policies related to agriculture, energy, environment, and climate. We prioritized policies with cross-sectoral implications or large-scale effects, especially those where conflicts or synergies are likely—such as policies aimed at increasing agricultural productivity versus reducing chemical inputs.

Additionally, we included policies that broadly affect pollinators, even if they were not specifically designed to improve pollinator conservation. In the following questions, you will be asked to evaluate the implications of these strategic objectives for pollinator conservation.

In this context, pollinator conservation refers to the combination of factors that contribute to the abundance, diversity, and health of pollinators, such as bees, butterflies, and hoverflies.

If you are completing the survey from a country outside the European Union, your responses are still relevant to all questions. In this case, please complete the assessment on a European scale rather than a national one.

Cross-cutting strategic policy objectives that can influence pollinators:

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1. Reduce the use of chemical pesticides by 50 % and the use of more hazardous pesticides by 50% by 2030 (Farm to Fork strategy, baseline 2018)
2. Cut nutrient losses by 50% by 2030 (Farm to Fork strategy, baseline 2018)
3. Reduce fertilizer use by at least 20% (Farm to Fork strategy, baseline 2018)
4. Increase the share of organic farming to 25% of agricultural land by 2030 (Farm to Fork strategy)
5. Improve C sequestration by carbon farming practices (rewetting peatlands, cover crops, agroforestry), 42 M ton by 2030 (Soil Strategy)
6. Solar strategy: Install 600 GW of solar panels (~2 million ha)
7. Plant 3 billion new trees before 2030 in urban areas and on and on farmland (Biodiversity strategy)
8. Restore at least 20% of the EU's land and sea areas by 2030 (Nature Restoration Law)
9. Double external funding for biodiversity to 7 billion euros (Biodiversity strategy)
10. Implementation of a European pollinator monitoring scheme (EUPoMS, that will establish a standardized monitoring scheme across all member states following a scientific protocol).

How strong an influence do you believe the following EU strategic policy objectives are likely to have on pollinator conservation if implemented in your country (across the EU, if answering outside of an EU country)?

	1. Very negative	2. Negative	3. Neutral	4. Positive	5. Very positive	I don't know
Reduce the use of chemical pesticides by 50 % and the use of more hazardous pesticides by 50% by 2030 (baseline 2018)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Cut nutrient losses by 50% by 2030 (baseline 2018)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

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Reduce fertilizer use by at least 20% (baseline 2018)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Increase the share of organic farming to 25% of agricultural land by 2030	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Improve C sequestration by carbon farming practices (rewetting peatlands, cover crops, agroforestry), 42 M ton by 2030	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Install 600 GW of solar panels (~2 million ha)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Increase the production of biomass for energy production for heating and cooling by 1.1 % per annum	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Restore at least 20% of the EU's	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

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land and sea areas by 2030						
Implementation of a European pollinator monitoring scheme (EUPoMS, that will establish a standardized monitoring scheme across all member states following a scientific protocol)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Double external funding for biodiversity to 7 billion euros	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Plant 3 Billion new trees before 2030 in urban areas and on and on farmland	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Other	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

If you have noted "other" please elaborate which additional objectives you refer to here:

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How certain are you of your assessment?

	1. Very uncertain	2. Uncertain	3. Neutral	4. Certain	5. Very certain	I don't know
Reduce the use of chemical pesticides by 50 % and the use of more hazardous pesticides by 50% by 2030 (Farm to Fork strategy, baseline 2018)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Cut nutrient losses by 50% by 2030 (Farm to Fork strategy, baseline 2018)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Reduce fertilizer use by at least 20% (Farm to Fork strategy. baseline 2018)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Increase the share of organic farming to 25% of agricultural land by	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

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2030 (Farm to Fork strategy)						
Improve C sequestration by carbon farming practices (rewetting peatlands, cover crops, agroforestry), 42 M ton by 2030 (Soil Strategy)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Install 600 GW of solar panels (~2 million ha) (Solar strategy)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Increase the production of biomass for energy production for heating and cooling by 1.1 % per annum (Renewable Energy Directive III)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Restore at least 20% of the EU's land and sea areas by 2030 (Nature Restoration Law)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

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Implementation of a European pollinator monitoring scheme (EUPoMS, that will establish a standardized monitoring scheme across all member states following a scientific protocol)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Double external funding for biodiversity to 7 billion euros (Biodiversity strategy)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Plant 3 Billion new trees before 2030 in urban areas and on and on farmland (Biodiversity strategy)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Other	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

If you have other reflections regarding the influence of European strategic objectives on pollinators or your assessment of this influence, please provide a comment in the box below

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Section #3 Synergies with instruments and measures

In the second step of our analysis, we screened a set of measures that may influence pollinator conservation but are not necessarily developed to improve pollinator conservation. The measures we considered are pursued either by way of 1) regulatory interventions or 2) voluntary measures such as economic incentives or provisioning of information.

In this context, pollinator conservation refers to the combination of factors that contribute to the abundance, diversity, and health of pollinators, such as bees, butterflies, and hoverflies.

GAEC stands for "Good Agricultural and Environmental Conditions", a set of standards that all farmers in the European Union (EU) must follow to receive full payments under the Common Agricultural Policy (CAP).

Regulatory measures

How would you evaluate the potential influence of the policy measures on pollinator conservation in your country (across the EU, if answering outside of an EU country)?

	1. Very negative	2. Negative	3. Neutral	4. Positive	5. Very positive	I don't know
GAEC 1: Maintaining permanent grasslands	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
GAEC 2: Protect wetlands and peatlands	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
GAEC 3: Maintain soil organic matter	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

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and soil structure through a ban of burning arable stubble						
GAEC 4: Protect water from pollution through the establishment of buffer strips along water courses	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
GAEC 5: Prevent soil erosion through relevant practices	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
GAEC 6: Protect soil by defining rules for minimum soil cover	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
GAEC 7: Preserve the soil potential through field level crop rotation within farms	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
GAEC 8: A place ensuring the maintenance of non-productive	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

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areas and landscape features, and ensuring the retention of landscape features through, for example, a ban on cutting hedges and trees during the bird breeding and rearing season.						
GAEC 9: Protecting environmentally-sensitive permanent grasslands in Natura 2000 sites.	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Designated Natura 2000 sites	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Other regulatory initiatives	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

If you have noted "other", please elaborate which additional regulatory initiatives you refer to here:

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Voluntary measures

How would you evaluate the potential influence of the policy measures on pollinator conservation in your country (across the EU, if answering outside of an EU country)?

	1. Very negative	2. Negative	3. Neutral	4. Positive	5. Very positive	I don't know
Eco-schemes (voluntary environmental measures under the CAP that provide financial incentives to farmers for adopting sustainable farming practices that benefit the environment and biodiversity)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Agri-environmental and climate measures (policies under the CAP that provide financial support to farmers for adopting farming practices that protect the environment, mitigate climate change, and promote sustainable land management)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

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Advisory service provided to land users in your country	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

Regulatory measures
How certain are you of your assessment?

	1. Very uncertain	2. Uncertain	3. Neutral	4. Certain	5. Very certain	I don't know
GAEC 1: Maintaining permanent grasslands	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
GAEC 2: Protect wetlands and peatlands	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
GAEC 3: Maintain soil organic matter and soil structure through a ban of burning arable stubble	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
GAEC 4: Protect water from pollution through the establishment of buffer strips	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

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along water courses						
GAEC 5: Prevent soil erosion through relevant practices	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
GAEC 6: Protect soil by defining rules for minimum soil cover	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
GAEC 7: Preserve the soil potential through field level crop rotation within farms	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
GAEC 8: A place ensuring the maintenance of non-productive areas and landscape features, and ensuring the retention of landscape features through, for example, a ban on cutting hedges and trees during the bird breeding and rearing season.	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

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GAEC 9: Protecting environmentally-sensitive permanent grasslands in Natura 2000 sites.	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Designated Natura 2000 sites	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Other regulatory initiatives	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

Voluntary measures

How certain are you of your assessment?

	1. Very uncertain	2. Uncertain	3. Neutral	4. Certain	5. Very certain	I don't know
Eco-schemes (voluntary environmental measures under the CAP that provide financial incentives to farmers for adopting sustainable farming practices that benefit the	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

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environment and biodiversity)						
Agri-environmental and climate measures (policies under the CAP that provide financial support to farmers for adopting farming practices that protect the environment, mitigate climate change, and promote sustainable land management)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Advisory service provided to land users in your country	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

If you have other reflections regarding the influence of European strategic objectives on pollinators or your assessment of this influence, please provide a comment in the box below.

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Section #4: Overall assessment

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What is your overall assessment of the influence of the Common Agricultural Policy (CAP) measures on pollinators in your country?

(1) ❍ 1. Very poor	(2) ❍ 2. Poor	(3) ❍ 3. Fair	(4) ❍ 4. Good	(5) ❍ 5. Excellent	(6) ❍ I don't know

To which extent would you assess that sufficient resources are allocated for measures and instruments to improve pollinator conservation in your country?

(1) ❍ 1. Very unsufficient	(2) ❍ 2. Unsufficient	(3) ❍ 3. Moderately sufficient	(4) ❍ 4. Sufficient	(5) ❍ 5. Very sufficient	(6) ❍ I don't know

In your perspective how important are the following additional measures in your country to improve pollinator conservation?

	1. Least important	2. Slightly important	3. Moderately important	4. Important	5. Very important	I don't know
Raising industry standards	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Initiatives in the value chain of agro-food companies	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Increased habitat restoration and creation (e.g. wildflower meadows, hedgerows)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

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Reduction of pesticide use and promotion of safer alternatives	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Implementation of pollinator-friendly farming practices (e.g. crop diversification, agroecology)	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Improved legislation and stronger enforcement of pollinator protection policies	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Enhanced public awareness and education for pollinator conservation	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Increased funding for research on pollinator health and behaviour	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

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Better monitoring and data collection on pollinator populations	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍
Other	(1) ❍	(2) ❍	(3) ❍	(4) ❍	(5) ❍	(6) ❍

Are there any regulations, schemes or aspects that we are missing in this survey? Please provide your comment in the box below.

_____
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Thank you for taking the time to complete this survey.

If you have general comments or reflections regarding the project or the survey for the research group, please note in the box below.

_____
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When you click "Next", your replies will be saved and the window will be closed.

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Appendix C: Concept for the workshop

AGENDA

10:00-10:20: **Welcome and introduction.** Introduction to the program of the day and briefly to RestPoll for participants outside the project.

10:20-10:30: **Presentation of survey results.** Method in the policy coherence analysis and results from the mapping of coherence of strategic priorities.

10:30-11:40: **Breakout discussions.** Depending on number of participants, we split the panel in breakout discussion in three groups based on geography, dividing in a similar way as in the paper by Cole et al. (2022) following the Köppen–Geiger climate classification (see Figure A3.1):

- Group 1: Northern and Western Europe (Scandinavia, Finland, UK, Ireland, Germany, Netherlands, Belgium, France, Switzerland)
- Group 2: Southern Europe (Portugal, Spain, Italy, Balkans, Greece, Hungary)
- Group 3: Eastern Europe (Rumania, Austria, Poland, Hungary, Bulgaria, Baltic countries, Czech Republic, Slovakia)

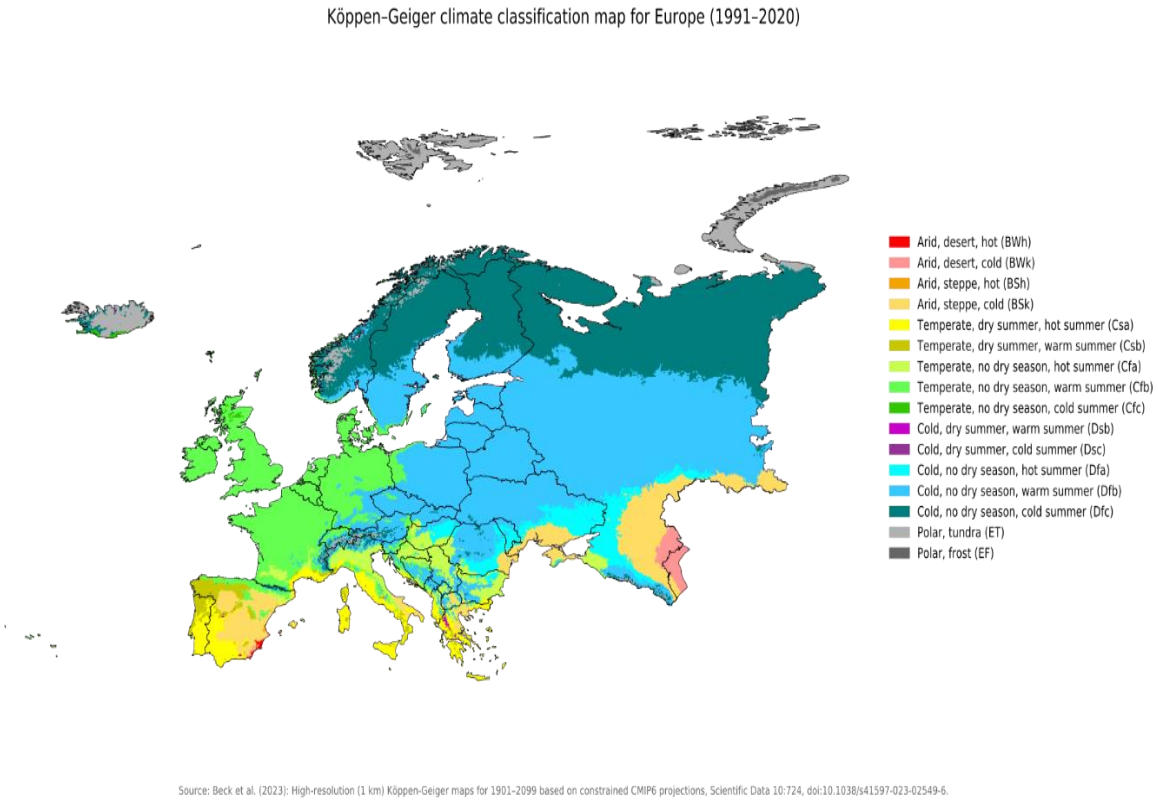

Figure A3.1: Köppen–Geiger climate classification applied for the classification of countries in the survey and workshop

For each group 1) an internal facilitator and 2) a notetaker will ensure that the discussion stays on track.

10:30-11:00: **Breakout discussion 1:** Coherence of strategic objectives

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11:05-11:40: **Breakout discussion 2:** Coherence of measures

For each breakout discussion, we will focus on 1, discuss the implication the mapping

11:45-12:00: Summary of breakout discussions and rounding off: Facilitators, or an appointed speaker from the group will present the results of the two breakout discussions. Presentation of results of mapping of instruments and measures. Towards the end we will ask participants to add their name in a list if they would like to join a potential publication resulting from the work.

MIRO SETUP
The Miro page for each breakout discussion will be divided up in two panels, as shown below. Above each panel a figure summarizing the survey results will be shown.

The discussions in the breakout rooms will take a point of departure in a Miro board exercise, where participants initially will be given ~5-10 minutes to fill in a couple of post-it notes using the template and questions provided below. After this initial individual brainstorming exercise, the facilitator

Two persons will facilitate discussion in each breakout group, a moderator and a note taker. 1) The role of the moderator is to ensure that the discussion stays on track, keep time and facilitate the dialogue among partners. 2) The role of the note taker is to keep record of the discussion and to summarize key conclusions from the day.

<u>For facilitators:</u>

- Allow participants 3-5 minutes of reflection time initially, for participants to gather their thoughts and write reflections on a note or a post-it. One reflection pr. post it.
- Ask participants to include a link to scientific research if they know of specific papers that provide a justification for the points they raise.
- Go through the matrix from top to bottom, field at a time, and allow individual participants time to share their reflections.

<u>For note takers:</u>

- We will use the Miro boards as a point of departure for summarizing the discussions from the workshop, therefore, please keep track of discussions and add notes if anything is mentioned but not put in notes.

Matrix for breakout discussion 1

The first breakout discussion will address three questions, linking up with results from the first part of the survey (see Figure A3.2).

Further the question: “What is needed overall to improve the consideration for pollinators in strategic policy objectives at European level?”

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Matrix for breakout discussion 2

The second breakout discussion will address two questions, linking up with the 2nd part of the survey to address, how the coherence can be improved for each of the measures and instruments identified, and secondly, what is overall needed to strengthen the protection of pollinators at European level in terms of measures and instruments?

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Breakout discussion 1: Coherence of strategic objectives

The first breakout discussion focuses on two critical questions derived from the initial survey results. Participants will explore how coherence can be improved for each strategic objective and identify what is needed to strengthen pollinator protection at the European level.

First part

Strategic objectives	What are from your perspective the most important challenges for pollinators in the implementation of the strategic objectives?	How can considerations for pollinators be improved in the implementation of the objective?
1 Reduce the use of chemical pesticides by 50% and the use of more hazardous pesticides by 50% by 2030 (Farm to fork strategy, baseline 2018)		
2 Cut nutrient losses by 50% by 2030 (Farm to Fork strategy, baseline 2018)		
3 Reduce fertiliser use by at least 20% (Farm to Fork strategy, baseline 2018)		
4 Increase the share of organic farming to 25% of agricultural land by 2030		
5 Improve C-sequestration by carbon farming practices (such as rewetting peatlands, cover crops, agroforestry), 42M ton by 2030 (Soil strategy)		
6 Install 320 GW of solar panels (~0.5-1 million ha) (Solar strategy)		
7 Increase the production of biomass for energy production for heating and cooling by 1.1% per annum (Renewable Energy directive)		
8 Restore at least 20% of the EU's land and sea areas by 2030 (Nature Restoration Law)		
9 Implementation of a European pollinator monitoring scheme (EUPoMS, that will establish a standardised monitoring scheme across all member states following a scientific protocol)		
10 Biodiversity strategy: Double external funding for biodiversity to 7 billion euros		
11 Biodiversity strategy: Plant 3 billion new trees before 2030 in urban areas and on farmland		
12 Other strategic objectives		

Second part

What is needed overall to improve the consideration for pollinators in strategic policy objectives at European level?

Breakout Discussion 2: Coherence of measures

The second breakout discussion will address two questions, linking up with the 2nd part of the survey to address, how the coherence can be improved for each of the strategic objectives, and secondly, what is overall needed to strengthen the protection of pollinators at European level?

First part

Instruments and measures	What are from your perspective the most important challenges for pollinators in the implementation of the measures and instruments?	How can considerations for pollinators be improved in the implementation of the measures and instruments?
1 GAEC 1: Maintaining permanent grasslands		
2 GAEC 2: Protect wetlands and peatlands		
3 GAEC 3: Maintain soil organic matter and soil structure through a ban of burning arable stubble		
4 GAEC 4: Protect water from pollution through the establishment of buffer strips along water courses		
5 GAEC: 5 Prevent soil erosion through relevant practices		
GAEC 6: Protect soil by defining rules for minimum soil cover		
GAEC 7: Preserve the soil potential through field level crop rotation within farms		
GAEC 8: A place ensuring the maintenance of non-productive areas and landscape features		
GAEC 9: Protecting environmentally-sensitive permanent grasslands in Natura2000 sites		
Designated Natura2000 sites		
Eco-schemes (voluntary environmental measures under the CAP that provide financial incentives to farmers for adopting sustainable farming practices that benefit the environment and biodiversity.)		
Agri-Environmental and Climate Measures (policies under the CAP that provide financial support to farmers for adopting farming practices that protect the environment, mitigate climate change, and promote sustainable land management.)		

Second part

What is needed overall to improve the consideration for pollinators in the instruments and measures available across Europe?

Regulatory initiatives	Support programs	Advisory programs

RESULTS

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The following section contains the input provided by pollinator experts at the workshop. The text noted in yellow illustrates input that relates to the European level, while the text noted in red, illustrates input that relates to a national level. The input is presented per regional group (Northwestern, Southern, and Central Europe), dividing each into those, starting with expert comments on strategic objectives, followed by comments on instruments and measures.

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GROUP 1: NORTHERN EUROPE – STRATEGIC OBJECTIVES

Strategic objectives	What are from your perspective the most important challenges for pollinators in the implementation of the strategic objectives?	How can considerations for pollinators be improved in the implementation of the objective?
Reduce the use of chemical pesticides by 50% and the use of more hazardous pesticides by 50% by 2030 (Farm to Fork strategy, baseline 2018)	• Feeling of losing competitiveness vis-a-vis other continents (e.g. negotiations with Mercosur [the Southern Common Market]) • Dominant worldviews in agricultural networks at EU level that pesticides are required for farming and that pest control is to be prioritised • Very hard to implement with the current view of pesticides as safe/not safe. This hinders a more ecological assessment and restricts the potential for reductions • Some interest groups having privileged access to EU institutions at the expense of others • Dependency on pesticides in short- term to ensure yield certainty (debt & revenue concerns among farming communities) • Target is voluntary; binding target was dropped (SUR was dropped) • Institutional silos across policy areas at EU level • Farmers are expecting alternative products • Resistance from farmers / Union of farmers • Reduced consumer demand for organic products (Denmark) • Strong union resistance to ban use of products on national important crop (sugarbeet in Belgium)	• Fostering networks of actors aiming for chemical pesticides reduction for various reasons (human health, pollinator health, etc.); and improving their access to EU policy making & governance • Consider buffer zone with low use of pesticide around areas with high diversity of threatened species
Cut nutrient losses by 50% by 2030 (Farm to	• Nutrient rich soils will remain nutrient rich. thus, the change	• Identifying trade-offs and synergies.

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Fork strategy, baseline 2018)	in vegetation as resource will not become available. • Actions to reduce nutrient run off into waterways potentially damaging to pollinator habitats.	
Reduce fertilizer use by at least 20% (Farm to Fork strategy, baseline 2018)	• Derogation farms (Ireland)	• Fertiliser reduction in field margins not only assessed at the filed/parcel level.
Increase the share of organic farming to 25% of agricultural land by 2030	• This is a general comment that covers all points - but a key challenge is to integrate efforts at landscape scales. How to ensure that one activity does not impede others, and ideally to generate synergy. This is an issue that is wider than pollinators. So how to implement the systems view. • Issue of consumer demand / price of organic food • For small farmers often not feasible • Some chemicals used in organic farming also toxic - e.g. copper in vineyards • Intensification of organic farming practices (may impact pollinators?) • People not ready to pay prices (too high) of organic food • Decreasing consumer demand for organic food • come up with business models that would give more options how to benefit from organic farming	• Targeted actions for pollinators, rather than organic [farming] per se (some organic crop systems and management types are not specifically pollinator friendly)
Improve C sequestration by carbon farming practices (such as rewetting peatlands, cover crops, agroforestry), 42	• The rewetting will provide a very valuable resource, but for a very small proportion of the pollinators in EU. While important, it is for the few • Identifying trade-offs and synergies of carbon farming practices and pollinator-friendly farming practices	• The timing of cover crop sowing will impact the likelihood of flowering. Sowing is dependent on weather. Flexibility for the farmer is needed. • Select crop/trees bringing floral / nesting resources

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M ton by 2030 (Soil Strategy)		
Install 320 GW of solar panels (~0.5-1 million ha) (Solar strategy)	• Management of grass underneath is key. Some solar companies prefer to keep the environment clean, reducing bird activity (i.e. poo) • The panels themselves do not provide an opportunity, but how the surrounding area is planned can have a mayor impact. From unhospitable to permanent habitat. • Converts seminatural or "conservation" perspective" land into PV instead of more beneficial management • Regulation of permissions	• Making sure that the design and management of the solar parks are adequate for pollinators • Management requirements to enhance floral and nesting resources • Incentives to include bee nesting resources (long grass, cavities) • Restrict to certain land use types like arable, or re-wetting areas • Depends very much on the implementation (e.g. sowing of flowers in spaces between solar panels). Could be designed to support pollinators, but current designs are probably not supporting pollinators
Increase the production of biomass for energy production for heating and cooling by 1.1 % per annum (Renewable Energy Directive)	• It's going to depend on the types of crops being grown, e.g. early-flowering, willow plantations could be much more beneficial than mass-flowering annual crops such as sunflowers • Biomass production can be thought for pollinators too. Several Salix species currently used in N EU are not providing resources. The selection of potential resource material should be pollinator supporting • Not expert knowledge but using the same area for PV + grassland yields much more energy and more biodiversity. So, stop this?	• Depends on implementation. Biomass production could increase flower availability, depending on plant mixtures used and management (especially cutting frequency) • See comment in other column - grow willows and other perennial woody crops rather than annual mass-flowering species
Restore at least 20% of the EU's land and sea areas by 2030 (Nature	• Article devoted to agroecosystems was removed during the NRL negotiations, leading to questions regarding the extent to which farmland	• Focus on the kinds of habitats that are most beneficial to pollinators and ensure that mosaics of

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Restoration Law)	will be affected by the NRL (to be cross-checked) • Habitat restoration that is appropriate to the needs of pollinators, e.g. flooding of old quarries to create wetlands & lakes, versus restoring for terrestrial habitats • Governments might differ substantially when it comes to the practical implementation of the law • Reluctance among private landowners based on fear of productivity loss (Sweden)	habitats are created across landscapes
Implementation of a European pollinator monitoring scheme (EUPoMS, that will establish a standardized monitoring scheme across all member states following a scientific protocol)	• EU funding efforts put on recording loss, rather than investing in staff to favour practice change • No coordination from Europe about who is doing the monitoring at MS level • Taxonomic capacity not broad enough for some countries • Many already established monitoring schemes for long time data • Direct input from European Commission to national governments • Resistance among farming representatives to be involved in such monitoring • Monitoring is a prerequisite for assessing the status of pollinators, but monitoring in itself will not save pollinators • Risk that volunteering time rerouted to conduct monitoring at the expense of raising awareness (a concern to be checked) • Funding for biodiversity is cut in Belgium with the new right-wing governments • Methods different in UK, where pollinator monitoring scheme uses pan traps	• High ambitions on the number of sampled sites • Be sure to capture all habitats • Consider species specific monitoring of threatened species (including species on national red list) • Good coordination with land manager, especially private sector

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Biodiversity strategy: Double external funding for biodiversity to 7 billion euros	• Overall issue of using offsetting as a source of conservation funding; unsure if this applies to the pollinator space • Not seen as priority by current commission • Supporting biodiversity is seen as negatively impacting economics • Lack of understanding by general public / voters of functional importance of biodiversity • Better support for SMEs in biodiversity monitoring and restoration • Competition from BD areas other than pollination • Overcome the siloing between ministries managing engagement with land use	• An awareness raising campaign for businesses/large organisations to point out that renting bee hives are not the answer to pollinator conservation!
Biodiversity strategy: Plant 3 billion new trees before 2030 in urban areas and on and on farmland.	• Management of the trees after planting • Production of native and melliferous trees • Training of people to plant correctly the trees • Loss of semi natural grassland/ wet grassland (Ireland)	• Include the need of melliferous and native trees in the specifications of implementation • Recommend flowering trees providing resources for pollinators, rather than wind-pollinated species • Precise idea of the pollinator fauna present in the area, and aim a match between local pollinator need and floral resources
Other	• In Britain, implementation of Biodiversity Net Gain (BNG) is creating huge uncertainties with respect to the future impacts on invertebrates of how habitats will be created/restored - see preprints/forthcoming papers by Natalie Duffus et al.	• Biodiversity strategy: further including actors that have practices that benefit multiple pollinators, yet that are currently under-represented and under-supported at EU level (e.g. cities, local citizen-based initiatives, educators, artists etc); and multiply networking/knowledge exchange opportunities to improve and multiply practices

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		• Biodiversity strategy & Natura 2000 areas/natural areas: Tackling rising conflicts with beekeepers • Pollinator red-lists would highlight the need for action

What is needed overall to improve the consideration for pollinators in strategic policy objectives at European level?

- A key challenge is to integrate efforts at landscape scales. How to ensure that one activity does not impede others, and ideally to generate synergy. This is an issue that is wider than pollinators. So how to implement the systems view.
- More staff devoted to pollinators and pollination ES by wild pollinators within the agricultural department at EU level; may help break silos across departments.
- Political will to place biodiversity on top of the EU political agenda (at the level of the General secretariat at EU level for example).
- More networking beyond the environmental department & its networks at EU level.
- Evidence-based results based payment mechanism.
- Increase the level of protection, Habitats Directive.
- Shift from pollination conservation to pollinator conservation.
- Better targets for green finance.
- Consider native plant while implementing mitigation strategy.
- Strong education needed on the importance and diversity of pollinators (and insect in general).
- Evaluation of mitigation strategy.

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GROUP 1: NORTHERN EUROPE – INSTRUMENTS AND MEASURES

Instruments and measures	What are from your perspective the most important challenges for pollinators in the implementation of the instruments and measures?	How can considerations for pollinators be improved in the implementation of the instruments and measures?
GAEC 1: Maintaining permanent grasslands	• Need payment to land manager for keeping permanent grassland • Highlight the importance of quality, not quantity (area) • Permanent grasslands can be very intensively manage or heavily grazed – not great for pollinators • Inconsistencies across EU objectives and policies, with the largest ones not favourable to farming systems that work with permanent extensive grasslands • Higher monetary rewards for forestry plantation (Ireland)	• Ensure that there are appropriate grazing/mowing/management plans in place for sites that involve cutting areas in a 2-3-4 years rotation as appropriate for sites • Improving representation of farming communities that favour permanent grasslands through heir practices; political and policy support for these communities • Across scales: work on value chains and markets for farming systems that favour permanent grasslands to be economically viable • Specify a biodiversity-focused definition of permanent grassland – low intensity management • Highlighting the value of these habitats for pollinators to farmers. Recognising farmers contributions to biodiversity for managing these habitats • Compensate extensification or award grassland quality • Award for the most beautiful grassland, including association of recorded pollinators
GAEC 2: Protect wetlands and peatlands	• Small size of the areas with low connection among the areas	• Advisory work on willow planting/management strategies that does not

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	• A lot of the measures would include restoring/re-flooding drained woodlands or fields, thereby reducing the productive area	involve cutting all of the trees in an area at the same time, i.e. ensuring that some will flower each year • A few pollinators are specific to these areas, at least for bees
GAEC 3: Maintain soil organic matter and soil structure through a ban of burning arable stubble	• Already in place, in DK.	
GAEC 4: Protect water from pollution through the establishment of buffer strips along water courses	• Identifying what seed should be used and clear recommendations (Ireland)	• Guidance to suggest flowering trees or floral resources in buffers • Additional monetary reward for allowing natural regeneration
GAEC 5: Prevent soil erosion through relevant practices	• Steep eroding banks can be important nesting sites for ground-nesting bees – identifying and maintaining such sites could run counter to this strategy	
GAEC 6: Protect soil by defining rules for minimum soil cover	• Creates a challenge in perennial crops (e.g. vineyards) who want to plant annual floral resources in between rows. • Could be challenging for ground-nesting bees?	• Allow exceptions for planting annual floral resources in perennial crops
GAEC 7: Preserve the soil potential through field level crop rotation within farms	• The movement away from traditional ploughing systems may reduce the available area for ground nesting bees (Ireland)	• Include flowering crops in the crop rotations • Include a fallow field
GAEC 8: A place ensuring the maintenance of non-productive areas and landscape features, and ensuring the	• Dominant worldviews in agri-networks at EU level considering that non-productive areas are lost and should be used for production • GAEC 8 – the requirement to devote at least 4% of	• Include management requirements to enhance resources for pollinators. See supplementary file in Cole et al for clear guidance: https://besjournals.onlinelibrary.wiley.co

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retention of landscape features through, for example, a ban on cutting hedges and trees during the bird breeding and rearing season.	arable land at farm-level to non-productive areas or features under the CAP was removed in 2024 (became and eco-scheme). https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-targeted-amendments-of-cap-regulations • Other GAECs have been affected too, see the link. • Change terminology – the areas are productive for ecosystem services	m/doi/full/10.1111/1365-2664.13572
GAEC 9: Protecting environmentally-sensitive permanent grasslands in Natura 2000 sites.	• Pollution from surrounding areas in Belgium • Strong pressure to use land in Belgium • Very small isolated areas in Belgium • Management rules on farmland don't always benefit pollinators in terms of increasing floral resources e.g. removal of grazing (Ireland) • Shortage of grazing in remote areas (Sweden)	• Good data on the spatial distribution of threatened species • Increase knowledge transfer to ministries, farmers, and advisors
Designated Natura 2000 sites	• Allowed setup of honey bee hives in the area can stress the wild pollinator dynamics • Natura2000 are selected in Belgium based on vertebrates. So, most of threatened species of bees in Belgium are not found in Natura2000 sites • Management rules on farmland don't always benefit pollinators in terms of increasing floral resources e.g. removal of grazing (Ireland)	• Increase knowledge sharing between ministries, farmers and advisors
Eco-schemes (voluntary environmental	• Effects depend a lot on the implementation, e.g. flower	• Investment in (or requirement for) good

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measures under the CAP that provide financial incentives to farmers for adopting sustainable farming practices that benefit the environment and biodiversity.)	mixture, or annual/perennial initiative • Habitat quality is often low. Farmer expertise in habitat management is limited • Limited guidance/advice available	habitat management advice • Mostly annual initiatives, longer term initiatives should be prioritised
Agri-Environmental and Climate Measures (policies under the CAP that provide financial support to farmers for adopting farming practices that protect the environment, mitigate climate change, and promote sustainable land management.)	• Habitat quality is often low. Farmer expertise in habitat management is limited • Seed companies do not always supply appropriate native seeds	• Target measures taking into account local context • Investment in (or requirement for) good habitat management advice

What is needed overall to improve the consideration for pollinators in the instruments and measures available across Europe?

Regulatory initiatives:

- Better metrics for measuring biodiversity by policy and businesses (e.g. EBVs).
- Consider the full diversity of pollinators, and not only a few common species.

Support programmes

- Programs focus on vertebrates and not invertebrates.
- Provide training to farmers.
- Add more pollinator/biodiversity training to the Green Cert curriculum (Ireland)
- Species conservation programmes, e.g. for lizards should focus on creating self-sustaining habitats of that species, not on short-term suitability (restoration) of that habitat. To allow umbrella-species concept to function.

Advisory programmes

- EU-level advisory support.

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- Advisory support stands with minimum knowledge transfer and sharing hours per year.
- EU-standards for biodiversity data collection.
- Iterations needed for the actions. This follow-up and fine-tune actions. Some will have adverse effects. An advisory board could assess incoming new knowledge.
- Ensuring that the promotion of ES by wild pollinators on farmland is supported at the level of agri-departments and related advisory programmes.

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GROUP 2: SOUTHERN EUROPE – STRATEGIC OBJECTIVES

Strategic objectives	What are from your perspective the most important challenges for pollinators in the implementation of the strategic objectives?	How can considerations for pollinators be improved in the implementation of the objective?
Reduce the use of chemical pesticides by 50% and the use of more hazardous pesticides by 50% by 2030 (Farm to Fork strategy, baseline 2018)	• A good IPM implementation is more important than a fix % reduction. Pesticides can only be used when needed. • Important for main ecosystem service providers conservation (Spain) • Direct reduction of pressure (insecticide), indirect (herbicide) and synergies (e.g. with fungicide) on polls will improve situation (France) • Overcome resistance from the chemical producers.	• Depends on policy implementation and compliance (and level of derogation) • Encouraging both agricultural and environmental ministries to interministerial dialogue (e.g. permanent round table) • Large risk that this policy will not be effective at reducing pesticide use • Ensure the reduction is linked to other good managing practices can be as damaging in some instances (Spain)
Cut nutrient losses by 50% by 2030 (Farm to Fork strategy, baseline 2018)	• Effect on polls is hard to know, plant compositional shifts may arise that benefit, but hard to predicts (France)	• Similar caveats than for 1. Nutrients should be used when

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		needed, and build a culture of austerity in chemical dependents (which are expensive)
Reduce fertilizer use by at least 20% (Farm to Fork strategy, baseline 2018)	• Effect on polls is hard to know, plant compositional shifts may arise that benefit, but hard to predicts (France)	• Similar caveats than for 1. Nutrients should be used when needed, and build a culture of austerity in chemical dependents (which are expensive)
Increase the share of organic farming to 25% of agricultural land by 2030	• Potential benefits by increasing floral resources for polls + reduce pesticide pressure (France) • Good level, but a challenge is continue supporting	• Field size is important too – for benefit
Improve C sequestration by carbon farming practices (such as rewetting peatlands, cover crops, agroforestry), 42 M ton by 2030 (Soil Strategy)	• Potentially beneficial indirectly, but outcome depends again on the plant composition post implementation • May provide more floral resources	• Potentially beneficial indirectly but outcome depends again on the plant composition post implementation
Install 320 GW of solar panels (~0.5-1 million ha) (Solar strategy)	• Depends on how grass surface is managed between rows.	• Solar farms should be placed in cities, roads, etc.... – and not in the fields (Spain)

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Increase the production of biomass for energy production for heating and cooling by 1.1 % per annum (Renewable Energy Directive)	• Level of cover low, so likely small effect, depends on crop planted and what it replaces • If conifer monocultures, or short-rotation willow coppice that never flowers, not so great for pollinators.	
Restore at least 20% of the EU's land and sea areas by 2030 (Nature Restoration Law)	• Best habitats for pollinators are open semi-nat grassland, shrubland, heathland. How much will be these habitats? • https://pubs.acs.org/doi/10.1021/acs.est.2c05311 • Most endangered pollinators need (semi-)natural habitats. (Spain) • Yes, the best (France)	• 20% needs to be fractal (20% at all scales), and not clustered (Spain)
Implementation of a European pollinator monitoring scheme (EUPoMS, that will establish a standardized monitoring scheme across all member states following a scientific protocol)	• Governance: who leads, agricultural or environment ministry? • Without knowing the status and trends of pollinators, we won't know if restoration is working (Spain) • Some countries (e.g. Spain) have shortcomings in the basic knowledge of species distribution. This will fix this problem. • Baseline knowledge, but not a direct improvement for polls, critical to justify to policy (France)	• Open standardised data sharing and transparency is needed.
Biodiversity strategy: Double external funding for biodiversity to 7 billion euros	• Great for research, if a % is action research (IA) then starts to have direct effects on poll (France) • Only if flower rich habitats are also favoured, as organic farms can be quite intensively managed (e.g. mechanical) (Spain)	
Biodiversity strategy: Plant 3 billion new trees before 2030 in urban areas and on	• Species composition again	

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and on farmland.		
Other		

What is needed overall to improve the consideration for pollinators in strategic policy objectives at European level?

- Social support and pressure to politicians
- Pollinator diversity is linked to plant diversity (flowers), which are easier to monitor and implement conservation actions on.
- NRL art 10 has specific mention of pollinators and target. It is required therefore for all sectors to see how their policy strategy and objectives intersects to deliver on that. So the NRL offers the possibility of a transversal policy that should be addressed by different policies.
- Policies like C or energy should consider how the implementation can be done in ways that also improve biodiversity and polls specifically.
- The so-called nexus of biodiversity-food-health (sensus IPBES) should become a principle that frames policy coherence for EC.
- Flexibility in implementation of conservation actions. For example, micro-reserves can work for pollinators, but there is not a fast an easy figure to protect small patches of land hosting endangered pollinators.

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GROUP 2: SOUTHERN EUROPE – INSTRUMENTS AND MEASURES

Instruments and measures	What are from your perspective the most important challenges for pollinators in the implementation of the instruments and measures?	How can considerations for pollinators be improved in the implementation of the instruments and measures?
GAEC 1: Maintaining permanent grasslands	• In southern countries grasslands are not an important pollinator habitat, shrublands, drylands should be a priority.	
GAEC 2: Protect wetlands and peatlands	• By increasing SNH areas can offer some benefits to specialist, rarer polls.	
GAEC 3: Maintain soil organic matter and soil structure through a ban of burning arable stubble		
GAEC 4: Protect water from pollution through the establishment of buffer strips along water courses	• Can offer support to polls via permanent grassy/woody habitat, but depends on how it is managed i.e. extensive or intensive.	
GAEC 5: Prevent soil erosion through relevant practices	• If practices include flowery cover, you can prevent erosion and add food for pollinators at once. Synergies are possible.	
GAEC 6: Protect soil by defining rules for minimum soil cover	• Many pollinators need bare soil to nest. This measure could be either good or bad depending on the context.	
GAEC 7: Preserve the soil potential through field level crop rotation within farms	• Context of implementation: currently rotations are not diverse, so effect marginal. If rotational diversity was more ambitious and incentivised, then can provide more	

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	resources/landscape diversity for pollinators. • Field diversity and small sizes benefits pollinators and yield: https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/1365-2664.14305	
GAEC 8: A place ensuring the maintenance of non-productive areas and landscape features, and ensuring the retention of landscape features through, for example, a ban on cutting hedges and trees during the bird breeding and rearing season.	• Essential to safeguard rare species habitat resources. • The quality of non-productive areas is key for pollinators. Can be very beneficial, or neutral.	• More effective if done both at field or farm and landscape scales: potential collective measures for groups of farmers?
GAEC 9: Protecting environmentally-sensitive permanent grasslands in Natura 2000 sites.	• Same as in 1. Grasslands are not the issue in southern countries, but EU politics are northern dominated (as this exercise also is).	
Designated Natura 2000 sites	• Preserving natural areas, of any size is the best action to protect rare, vulnerable species	• By a demand for wild pollinator species list for each Natura2000 site.
Eco-schemes (voluntary environmental measures under the CAP that provide financial incentives to farmers for adopting sustainable farming practices that benefit the environment and biodiversity.)	• Eco-scheme specific for pollinators are voluntary → needs to be encouraged! • Must have greater incentives for uptakes. • Yes, mostly for pollinators able to use agricultural areas (not the rare, endangered ones).	
Agri-Environmental and Climate Measures (policies	• Should be wins here (referring back to NRL target for pollinators) for	

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under the CAP that provide financial support to farmers for adopting farming practices that protect the environment, mitigate climate change, and promote sustainable land management.)	joining CC and BD (including polls) action. • Indirectly, all we can do for mitigating climate change is good for pollinators, as climate change is a strong driver of pollinator decline.	

What is needed overall to improve the consideration for pollinators in the instruments and measures available across Europe?

Regulatory initiatives:

- Fast system to protect relevant areas of pollinator diversity.
- Nature protection essential.

Support programmes:

- More incentive and support for bottom-up pollinator-friendly initiatives for farmers.
- Operationalise the NRL.
- More explicit mention of polls in different eco-schemes.
- Independent farmer extension (advisory) are essentials.

Advisory programs:

- Independent farmer extension (advisory) are essentials.

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GROUP 3: CENTRAL EUROPE – STRATEGIC OBJECTIVES

Strategic objectives	What are from your perspective the most important challenges for pollinators in the implementation of the strategic objectives?	How can considerations for pollinators be improved in the implementation of the objective?
Reduce the use of chemical pesticides by 50% and the use of more hazardous pesticides by 50% by 2030 (Farm to Fork strategy, baseline 2018)	• The reduction is not enforced in EU countries – some countries have exception. • Reducing few existing pesticides to almost zero will not improve the environment, but reduces crop availabilities for pollinators. Some countries have already very short list of pesticides. • Introduce space for a non-biased debate (currently everything related to use of agro-chemicals is heavily dominated by proming NGOs representing large farmers) (Czechia).	• Fasten the registering process of less hazardous pesticides.
Cut nutrient losses by 50% by 2030 (Farm to Fork strategy, baseline 2018)		
Reduce fertilizer use by at least 20% (Farm to Fork strategy, baseline 2018)		• Improve the digital systems which aid the precision agriculture.
Increase the share of organic farming to 25% of agricultural land by 2030		
Improve C sequestration by carbon farming practices (such as rewetting peatlands, cover crops, agroforestry),		

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42 M ton by 2030 (Soil Strategy)		
Install 320 GW of solar panels (~0.5-1 million ha) (Solar strategy)	• Loss of habitat for pollinators due to solar panel installations.	
Increase the production of biomass for energy production for heating and cooling by 1.1 % per annum (Renewable Energy Directive)	• Biomass production is probably not related to flowering plants.	
Restore at least 20% of the EU's land and sea areas by 2030 (Nature Restoration Law)	• Based on what would be the selection of areas under restoration.	• Transforming non-productive spaces into biodiversity hotspots, like power line corridors, or post-industrial lands (large areas in Central Europe)
Implementation of a European pollinator monitoring scheme (EUPoMS, that will establish a standardized monitoring scheme across all member states following a scientific protocol)	• It is important to fill the gaps, but this will bring us to state, in which the lists of insects are increasing, but not because of any measures taken. False conclusions can be made. • Monitoring does not save pollinators as such, specific measures are needed.	• Long-term monitoring programs must be established and paid for let's say 20 years.
Biodiversity strategy: Double external funding for biodiversity to 7 billion euros	• It is important to fill the gaps, but this will bring us to state, in which the lists of insects are increasing, but not because of any measures taken. False conclusions can be made.	
Biodiversity strategy: Plant 3 Billion new trees before 2030 in urban areas and on and on farmland.	• Needs to be planned and implemented carefully, otherwise it can do harm to pollinators. • Trees in urban areas have many more benefits than only pollinators.	• Some baseline of amount of trees and tree species needed to be established.
Other		

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What is needed overall to improve the consideration for pollinators in strategic policy objectives at European level?

N/a

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GROUP 3: CENTRAL EUROPE – INSTRUMENTS AND MEASURES

Instruments and measures	What are from your perspective the most important challenges for pollinators in the implementation of the instruments and measures?	How can considerations for pollinators be improved in the implementation of the instruments and measures?
GAEC 1: Maintaining permanent grasslands	• Permanent grasslands must be with local plant species not with what-ever seed mixture produced. Not all plant species like each soil type.	• Integration of climate adaptation strategies.
GAEC 2: Protect wetlands and peatlands		
GAEC 3: Maintain soil organic matter and soil structure through a ban of burning arable stubble		
GAEC 4: Protect water from pollution through the establishment of buffer strips along water courses		
GAEC 5: Prevent soil erosion through relevant practices		
GAEC 6: Protect soil by defining rules for minimum soil cover		
GAEC 7: Preserve the soil potential through field level crop rotation within farms	• Crop rotation must be very diverse, how to get it productive and profitable for a farmer?	
GAEC 8: A place ensuring the maintenance of non-productive areas and landscape features, and ensuring the retention of landscape features through, for example, a ban on cutting hedges and trees during the bird breeding and rearing season.		
GAEC 9: Protecting environmentally-	• Grasslands need to be worked on, best with	

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sensitive permanent grasslands in Natura 2000 sites.	cattle, but the is a problem for farmers – where to sell the animals? (Estonia)	
Designated Natura 2000 sites	• Not enough funding and resources – affects monitoring/efforts on restoration (Czechia)	• Emphasis on corridors between sites.
Eco-schemes (voluntary environmental measures under the CAP that provide financial incentives to farmers for adopting sustainable farming practices that benefit the environment and biodiversity.)	• The challenge is sustainability of payments for farmers – it is too bureaucratic, and therefore farmers do not apply. • The question is how to make the financially interesting…	
Agri-Environmental and Climate Measures (policies under the CAP that provide financial support to farmers for adopting farming practices that protect the environment, mitigate climate change, and promote sustainable land management.)	• National regulations for adopting the support are too strict and allow no good, new practices. • Complaints on too much bureaucracy (Czechia).	• Outdoor bird rearing not supported.

What is needed overall to improve the consideration for pollinators in the instruments and measures available across Europe?

Support programmes:

- No demand for organic products.

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