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Report

# Are CAP Strategic Plans supporting farmers to use biocontrol alternatives to pesticide use?





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## EXECUTIVE SUMMARY

Biocontrol applies a holistic approach to crop protection that considers the ecosystem health of the whole farm, pest and predator behavior and life cycles, in contrast to the use of conventional chemical pesticides. Biocontrol practices can be regarded as a fundamental component of integrated pest management (IPM), integrated production (IP), and organic farming, approaches that are key to achieving the EU's pesticide use reduction objective of the proposed Sustainable Use of Pesticides Regulation (SUR) as well as the Farm to Fork strategy and the EU Biodiversity Strategy 2030.

The use of biocontrol is increasing in a range of farming systems in the EU, but it is still at a very small scale compared to conventional pesticide use. Barriers to increasing use of biocontrol include lack of knowledge about biocontrol agents and practices; high costs for growers where the use of biocontrol agents is not subsidized (for example, through CAP support), and the possible lower efficacy compared to chemical pesticides if biocontrol is not used in an IPM system. Farmers introducing biocontrol may also need to make wider changes within an IPM framework, requiring farmers to start a transition process that can take several seasons of learning and adapting.

This report reviewed seven national CAP Strategic Plans with regards to whether and to what extent the planned interventions support biocontrol and/or Integrated Pest Management. The Common Agricultural Policy (CAP) remains the biggest source of EU funding and the uptake of biocontrol practices strongly depends on the national level implementation and individual ambitions of Member States in their CAP Strategic Plans for the 2023 to 2027 period. However, although the EU pesticide reduction target in the Farm to Fork Strategy is included in the recitals of the CAP Regulation, this is not legally binding, and the Member States were not obliged to include a quantified target for pesticide use reduction in their plans. As the proposed Sustainable Use of Pesticides Regulation (SUR) is still being negotiated, the ambitious pesticide reduction targets proposed also do not currently need to be reflected in the Strategic Plans.

The report makes the following recommendations on how the Strategic Plans should be adjusted to support and promote higher biocontrol uptake by farmers:

1. Support targeted advisory services and knowledge exchange between farmers.  
*Farmer to farmer exchanges, peer review networks, and researcher-farmer exchanges.*

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2. Support investments in specific techniques.  
*Investments in biocontrol techniques through investment support and through sectoral interventions.*
3. Provide support for specific biocontrol practices within more general support for pesticide reduction.  
*Targeted support to various biocontrol practices depending on the specific farming system.*
4. Include clear and strong incentives to learn and progress in the transition to biocontrol and IPM.  
*Inclusion of longer-term support, easy access to advice and knowledge exchange.*
5. Ensure attractive benefits attached to certification schemes linked to biocontrol practices.  
*Reimbursement of cost incurred to comply with the higher standards and the process of obtaining the certificate, promotion of certification schemes amongst consumers, strict monitoring and enforcement requirements, clear incentives to continue biocontrol over the long-term.*
6. Focus on providing support to longer - term transition and provide support for innovation and pilots.  
*Interventions focused on multiple year support, access to advice and innovation and research results, pilot projects developing innovative practices and new approaches.*

## LIST OF ABBREVIATIONS

AECM Agri-environment climate measure

CAP Common Agricultural Policy

CSP Common Agricultural Policy Strategic Plan

EIP European Innovation Partnership

IP Integrated Production

IPM Integrated Pest Management

RDP Rural Development Programme

SUD Sustainable Use of Pesticides Directive

SUR Sustainable Use of Pesticides Regulation



## 1. INTRODUCTION

The negative impacts of the excessive use of pesticides are a long-established fact. They not only impact human health<sup>1</sup> but also pollute waters and soils<sup>2</sup>, and deteriorate the status of farmland biodiversity and specifically pollinators<sup>3</sup>.

Biological control (biocontrol for short) is defined in the dictionary of agroecology and plant pathology as a practice comprising the use of living organisms or natural substances to prevent or reduce damage and diseases caused by harmful organisms such as animal pests, weeds and pathogens ((Busson, 2022; Prajapati et al, 2020)). As described in a previous IEEP report on biocontrol, in comparison to the typically linear approach to plant protection with conventional chemical pesticides, biocontrol applies a more holistic approach that considers the ecosystem health of the whole farm, pest and predator behaviour and life cycles, and the impact of pesticides on plant health (Hulot and Hiller, 2021). The overarching aim is to cause no harm to the environment, non-targeted species, and human health.

Biocontrol practices can be regarded as a fundamental component of integrated pest management (IPM), integrated production, and organic farming (see Box 2). They are also essential elements of the approaches that are key to achieving a reduction in the use and risk of chemical pesticides, one of the objectives of the proposed Sustainable Use of Pesticides Regulation (SUR)<sup>4</sup> as well as the Farm to Fork strategy<sup>5</sup> and the EU Biodiversity Strategy 2030<sup>6</sup>. Biocontrol has a recognized potential to replace pesticide use and protect and enhance biodiversity, and recent studies stress the fact that biocontrol is an important and preferred tool for crop protection within IPM ((Baker, Green and Loker, 2020; Niggli, 2020; Pflanzenschutz, 2019).

Box 1 below describes the categories of biocontrol, and examples of the ways in which they are used in farming systems.

### Box 1: Categories of biocontrol

Biocontrol is divided into four technical categories of practices<sup>7</sup>:

- macroorganisms (invertebrates) - for example, the placing of larvae or pupae of *Trichogramma ostriniae* parasitic wasps in maize fields to control European cornborer (*Ostrinia nubilalis*) damage (placed manually, with machinery, or with drones<sup>8</sup>); the release of insects in



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greenhouses to control tobacco whitefly (*Bemisia tabaci*) and western flower thrip (*Frankliniella occidentalis*)

- micro-organisms (viruses, bacteria and fungi) - applied as sprays to crops or drench to soil
- semiochemicals (pheromones) – used in traps set up in fields or greenhouses for either monitoring or deterrence or as dispensers that release sex pheromones to disrupt mating or applied directly as spray applications
- natural substances (for example, chalk or geranium oil) – applied as sprays to crops or dry scattered on soils or drench.

Biocontrol includes use of the low-risk substances approved under the EU regulation on plant protection products and the biological control agents approved under national laws.

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<sup>1</sup> The WHO estimated already in 1990 that about one million cases of unintentional pesticide poisonings occur annually, leading to approximately 20,000 deaths.

<sup>2</sup> Between 60-70% of EU soils are currently in poor state , source : EIP-AGRI, Life on Earth depends on healthy soils , available at: <https://ec.europa.eu/eip/agriculture/en/news/life-earth-depends-healthy-soils>

<sup>3</sup> 50% of land in the EU cultivated with crops dependent on pollinators already faces a pollination deficit, 10% of bee and butterfly species in Europe are on the verge of extinction, and 33% of them are in decline), source - EC, Farm to Fork: New rules to reduce the risk and use of pesticides in the EU, available at : [https://ec.europa.eu/commission/presscorner/detail/en/qanda\\_22\\_3694](https://ec.europa.eu/commission/presscorner/detail/en/qanda_22_3694)

<sup>4</sup> COM (2022) 305 final. The proposal sets legally binding targets at EU level to reduce by 50 % the use and the risk of chemical pesticides as well as the use of the more hazardous pesticides by 2030, in line with the EU's 'farm to fork' strategy.

<sup>5</sup> 50 % reduction in the use and risk of chemical pesticides and in the use of more hazardous pesticides, 25 % EU-wide organic farming target

<sup>6</sup> 10 % target of biodiversity areas within agricultural land

<sup>7</sup> IBMA, What are biocontrol technologies, available at: <https://ibma-global.org/what-is-biocontrol>

<sup>8</sup> For example, the method being developed by the Skyinnov company in France. <https://skyinnov.fr/en/2021/12/02/the-application-of-trichogramma-by-drone-to-control-the-corn-borer/>

## Box 2: Biocontrol in IPM, integrated production, and organic farming

**Integrated Pest Management (IPM)** is defined as 'careful consideration of all available means that discourage the development of populations of harmful organisms, while keeping the use of chemical plant protection products to levels that are economically and ecologically justified and minimise risks to human health and the environment.'<sup>9</sup>

Link to biocontrol:

- IPM is a broader system that builds on the use of mechanical, physical and cultural controls (through farming practices such as crop rotation, creating & maintaining habitats for natural biocontrol agents in field margins, ground cover, hedges etc), pest and disease monitoring, and targeted selective use of biocontrol and low risk biopesticides.

Organic farming has been defined in the Regulation (EU) 2018/848 on organic production and labelling of organic products as a sustainable management system guided by several principles laid down in the Regulation. It uses only plant protection products that are subject to explicit authorization through restrictive positive lists that exclude synthetic chemical pesticides.

Link to biocontrol:

- Organic farmers are strong users of biocontrol agents and practices, such as for example use of invertebrates in organic fruit farming, augmentative release of other natural enemies in different productions, the use of pheromones in vine and maize production, application of insect pathogenic virus or nematode preparations against pests in horticulture and fruit.

**Integrated production** is a concept of sustainable agriculture based on agro-ecology and a system approach that aims at contributing to sustainable, resilient, profitable and robust farming systems<sup>10</sup>.

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<sup>9</sup> SUR proposal, Article 3 (15))

<sup>10</sup> IOBC-WPRS Integrated Production Objectives and Principles available at <https://iobc-wprs.org/ip-tools/integrated-production-objectives-and-principles/>

Link to biocontrol:

- IP uses all the components of IPM including biocontrol but goes beyond pest and weed control to address crop and livestock health more widely.

The use of biocontrol is increasing in a range of farming systems in the EU, but it is still at a very small scale compared to conventional pesticide use. Biocontrol is generally more easily used in greenhouses and closed environments. For example, biocontrol is used in around 96% of pepper crops produced in greenhouses Almeria and Granada (the highest percentage among all crops), and around 71% of greenhouse tomato production<sup>11</sup>. It is also increasingly widely used in some outdoor cropping systems, notably the release of *Trichogramma* parasitic wasps on a quarter of France's maize production (SKYINNOV, 2021), and the widespread use of pheromones to disrupt the mating of vine moths (*Eupoecilia ambiguella*) in German vineyards. Barriers to increasing use of invertebrate biocontrol include lack of knowledge about biocontrol agents and practices; in some cases higher costs for growers where the use of invertebrate biocontrol agents is not subsidized (for example, through CAP support)<sup>12</sup>, and the low efficacy compared to chemical pesticides if invertebrate biocontrol is not used in an IPM system, as highlighted by the European Commission in a recent Staff Working Document (European Commission, 2022).

Usually, introducing a biocontrol practice into a farming system will only work if wider changes are made within an IPM framework, and it requires farmers to start a transition process that can take several seasons of learning and adapting. A healthy and resilient farmland ecosystem is a prerequisite for the successful implementation of biocontrol practices, as healthy soils and biodiversity are needed to support the practices. Naturally occurring predators and parasites of pests and diseases, known as natural enemies, can be encouraged and increased by creating and maintaining areas of refuge and food resources, such as flower strips, hedgerows, and grass banks ((Lambion, 2021). Similarly, a mapping of evidence from the EU by Holland et al (2017) found that semi-natural habitats have an overall positive effect on deployment of biocontrol, meaning the effect

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<sup>11</sup> Horti daily, '96% of pepper crops in Almeria and Granada use biological control against pests', 1 December 2022, available at: <https://www.hortidaily.com/article/9483022/96-of-pepper-crops-in-almeria-and-granada-use-biological-control-against-pests/>

<sup>12</sup> This argument applies to the use of invertebrate biocontrol agents in open field crops.

was greater in the right conditions. More diverse crop rotations, better soil health through increased soil organic matter, more diverse and flower-rich intercrop or groundcover vegetation, and more balanced use of fertilizers and irrigation are also important supporting practices.

Farmers also need access to independent and specialized farm advice, opportunities to learn from peers, and access to information and data on pest and disease pressures and thresholds. They may also need to invest in their farming system to alter physical and cultural characteristics and switch machinery. In the longer term, farmers need access to advice and innovation and research results to help find solutions to new pest outbreaks, due to newly introduced invasive pests, or by pests shifting target and abundance in response to climate change. Successful biocontrol approaches cannot be continued indefinitely without adaptation, as at some point there will always be a need to adjust to changing pest pressures and environment.

There are also persisting legal and policy obstacles standing in the way of wider biocontrol uptake. Although IPM has been obligatory for Member States since 2014, there has been insufficient progress in promoting its use and alternative approaches or techniques, including biocontrol<sup>13</sup>. The Farm to Fork Strategy stated the clear need for a new legislative instrument as the existing implementation of the Sustainable Use of Pesticides Directive (SUD) has not resulted in a noticeable reduction in pesticide use.<sup>14</sup> The Sustainable Use of Pesticides Regulation (SUR) proposal sets legally binding targets at EU level to reduce by 50 % the use and the risk of chemical pesticides as well as the use of the more hazardous pesticides by 2030, in line with the Farm to Fork strategy, and has the objective to increase IPM application and enforcement<sup>15</sup>.

Biocontrol features prominently in the proposed SUR. The proposal describes biological control agents as a sustainable control alternative to the use of chemical products for the control of harmful organisms. It further refers to biocontrol's growing importance in sustainable agriculture and forestry and its instrumental role in the success of IPM and organic farming<sup>16</sup>. The proposal

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<sup>13</sup> EC, Farm to Fork: New rules to reduce the risk and use of pesticides in the EU, available at : [https://ec.europa.eu/commission/presscorner/detail/en/qanda\\_22\\_3694](https://ec.europa.eu/commission/presscorner/detail/en/qanda_22_3694)

<sup>14</sup> Ibid.

<sup>15</sup> COM (2022) 305, available at: <https://www.europeansources.info/record/proposal-for-a-regulation-on-the-sustainable-use-of-plant-protection-products-and-amending-regulation-eu-2021-2115/>

<sup>16</sup> As stated in the Council Decision (EU) 2021/1102 of 28 June 2021 requesting the Commission to submit a study on the Union's situation and options regarding the introduction, evaluation,

stresses the need to define the concept of biological control as a basis for Member States to set indicative targets to increase the percentage of crops on which biological control agents are used. The current lack of an EU definition of biocontrol is a contributing factor to its lack of availability and visibility at the national level.

Achieving the EU's pesticide reduction targets and increasing the use of biocontrol will strongly depend on support to farmers through the national Strategic Plans prepared by the Member States under the Common Agriculture policy (CAP).

The CAP in 2023 to 2027 provides a series of instruments that can support farmers to reduce pesticide use and transition to IPM and biocontrol. These are principally the Agri-Environment Climate Measures (AECM) under Pillar II and the new eco-schemes under Pillar I, but also the sectoral interventions, investments, provision of farm advice and knowledge exchange, and cooperation and innovation measures and pilot projects. Although the tools to drive a change to more sustainable agriculture are there, a recent NGO assessment of the draft CAP Strategic Plans concluded that both eco-schemes and Pillar II measures need to be strengthened to ensure a shift to agro-ecological practices that would enable the effective implementation of IPM, and truly lower pesticide use (EEB and Birdlife, 2022). Nevertheless, the CAP remains the biggest source of EU funding and the uptake of biocontrol practices will strongly depend on the national level implementation and individual ambitions of Member States in the coming years.

Farmers receiving CAP payments must comply with national guidance and requirements on pesticide application and safety (through the Statutory Management Requirements SMR7 and SMR8 which refer to the corresponding articles in the SUD and the EU Regulation on plant protection products). However, the SUD article on IPM is not binding on farmers, despite the Court of Auditors recommendations in 2020 to make IPM a condition to receive CAP area payments ((European Court of Auditors, 2020)). Moreover, although the EU pesticide reduction target of the Farm to Farm Strategy is included in the recitals of the CAP regulation, this is not legally binding. Member States were thus not obliged to include a quantified target for pesticide use reduction in their Strategic Plans.<sup>17</sup> The same applies to the proposed SUR – as the CAP Strategic Plans were

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production, marketing and use of invertebrate biological control agents within the territory of the Union and a proposal, if appropriate in

view of the outcomes of the study (OJ L 238, 6.7.2021, p. 81).

<sup>17</sup> Arc 2020, Can the CAP Strategic Plans Help in Reaching our Pesticide Reduction Goals? , September 2022, available at: <https://www.arc2020.eu/can-the-cap-strategic-plans-help-in-reaching-our-pesticide-reduction-goals/>

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approved prior to the final version of the SUR, which is still being negotiated, the ambitious targets proposed do not currently need to be reflected in the strategic plans. If the SUR is adopted, revisions of the CAP Strategic Plans will need to take the requirements of the regulation into account. This report reviews seven national CAP Strategic Plans for their support for biocontrol and IPM and provides recommendations how support for biocontrol solutions can be strengthened in the national CAP Strategic plans.

## 2. HOW ARE NATIONAL CAP STRATEGIC PLANS SUPPORTING BIOCONTROL?

This section analyses seven national CAP Strategic Plans for France, Germany, Denmark, Austria, Poland, Spain and the Netherlands with regards to their support for biocontrol practices. It analyses whether and to what extent each of the CAP interventions features aspects that support biocontrol and/or IPM.

The report does not comprehensively review support for organic farming and only highlights those interventions with the biggest potential for biocontrol uptake.

### 2.1 France

The French CSP offers six RDP measures within Pillar II which have a potential to increase biocontrol uptake by farmers. The 5-year agri-environment contract commitments cover vineyards and orchards, and any arable crops.

A positive sign of the agri-environment scheme (EACM 70.07) for vineyards and orchards is that biocontrol is an option for farmers. The operational programme for the fruit and vegetable sector includes co-financing of investments allowing the use of biological control methods as an alternative to the use of plant protection products. However, no further details and conditions are spelled out in the CSP, which makes it difficult to assess whether these supports provide a real incentive to farmers to shift to biocontrol.

An innovation in the French plan is that one of the sub-measures under the new result - based agri-environment scheme (AECM 70.27) supports farmers in reducing their pesticide use using a results-based approach. The scheme is available for on all farming types. Farmers receive a payment if they reduce their pesticide Treatment Frequency Index by 30% over 5 years. Biocontrol practices could be potentially supported under this sub-measure although they are not specifically mentioned, as the results-based approach gives farmers the flexibility to apply the practices or approaches they find work best to achieve the pesticide use reduction. Farmers can choose between three themes - pesticides, GHG emissions or feed autonomy – in the same scheme, so it is difficult to predict what proportion of the 135 million euros dedicated for this intervention will actually be spent on pesticide use reduction. While this result-based payment could provide an incentive for biocontrol adoption, the proportion of the budget going to biocontrol is potentially small which could mean that few farms take part (Midler and Pagnon, 2023). The target set for the payment (-30% in the Treatment Frequency Index) is substantially lower than the targets defined in the European



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Farm to Fork Strategy (-50% of pesticide use by 2030) and in France's National Ecophyto II Plan (-50% of pesticide use in 2025 compared to 2015).

In the French overseas territories, the CAP plan supports the use of biocontrol in bananas, fruit and vegetables, and fruit orchards, systems that are heavy users of pesticides. The schemes appear to be attractive to producers as the intervention compensates for loss of income as well as additional expenditure, and the pheromone traps are relatively easy to implement and use. It would be beneficial if more knowledge and advice were provided to farmers about pest pressure on different crops, so that farmers can adapt their crop protection actions. A similar scheme is available in Corsica for permanent crops in arboriculture, viticulture, permanent crops and arable vegetables.

One of the three eco-scheme pathways supports increased crop diversity and interrow vegetation cover in all types of crops, which is an IPM supporting practice but is unlikely to lead to substantial pesticide reduction on its own (Midler and Pagnon, 2023).

**Table 1: French CSP interventions supporting biocontrol measures**

CAP intervention	Title and number of intervention	Brief description and objective of biocontrol or IPM measure
Eco-schemes	No measures found	
AECM	70.27 : Environmental and climate commitment supporting the transition of practices specifically <b>the reduction of pesticide use</b>	<p>The new flat-rate payment for the transition of practices (70.27) is a result-based payment aiming to support farms' ecological transition and is based on a personalised and progressive approach, assessing the results achieved at the end of the period compared to an initial diagnosis. Farmers can <b>choose between three themes: pesticides, GHG emissions or feed autonomy</b>.</p> <p>Under the pesticides sub-measure farmers receive a payment if they <b>reduce their pesticide Treatment Frequency Index by 30% over 5 years</b>. Budget is an unknown portion of the 135 million euros dedicated for this intervention.</p>
	70.07 : AECM for water quality and quantity management for perennial crops in France. It is aimed at <b>vineyards and orchards</b>	<p>This AECM is aimed at preserving the quality of water resources by reducing pollution by phytosanitary products, in particular by mobilising <b>biological control</b>. The intervention corresponds to an annual payment per hectare that compensates for the loss of income and additional costs incurred by the implementation of these practices.</p> <p>Requirements: Respect the frequency and minimum means of biological control to be carried out per year, as defined in the specifications.</p>
	70.15: Agri-environmental and climate measure for <b>banana crops</b> in the French overseas departments	<p>Alternative pest control for <i>Cosmopolites sordidus</i>: maintain at least 8 <b>pheromone traps</b> per hectare each year. In the year of fallow, have at least 16 traps per hectare.</p> <p>The objective is to encourage farmers <b>to implement agricultural practices that have a beneficial effect on natural resources in particular water and</b></p>

		<p><b>biodiversity</b> (in particular: reduced use of herbicides, sustainable inter-ranging practices, scouring, alternative weevil control practices, introduction of fallow in rotations).</p> <p>As part of this intervention, the operators voluntarily undertake to implement for five years the practices laid down in the specifications of the measure taken. The intervention corresponds to an annual payment per hectare which <b>compensates for the loss of income and the additional costs incurred in implementing these practices.</b></p>
	<p>70.17: Agri-environmental and climate measure for <b>market gardening</b> in the French overseas departments</p>	<p>This measure refers to the implementation of alternative pest control practices for tropical <i>Diptera</i> and <i>Tephritidae</i>: <b>traps for monitoring and controlling population</b>, collection and export for destruction of unmarketable fallen vegetables, uprooting host plants of the tropical <i>Diptera</i> and <i>Tephritidae</i>, installation and use of 2 augmentariums/ha for fruit vegetables, spot treatments by biocontrol, clay-based treatments for courgettes, pumpkins and respect for the crop rotation calendar.</p> <p>The intervention corresponds to an annual payment per hectare <b>which compensates for the loss of income and the additional costs incurred in implementing these practices.</b></p>
	<p>70.18 Agri-environmental and climate measure for <b>specialised orchards</b> in the French overseas departments</p>	<p>This measure refers to the implementation of <b>biological control techniques</b>. This includes alternative pest control practices including monitoring tropical <i>Diptera</i> and <i>Tephritidae</i>: <b>traps for monitoring and controlling</b>, collection and export for destruction of unmarketable fallen fruit, installation and use of 2 augmentariums/ha, spot treatments by biocontrol, clay-based treatments for mangoes and certain citrus varieties in particular.</p>

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	70.25: MAEC lump sum: "Protection of water resources - Integrated control" - <b>Corsica</b>	Combination of several alternative methods to plant protection products <b>including biological control, mass trapping trapping and/or mating disruption methods.</b>
<b>Sectoral interventions</b>	50.01 : Operational programme Fruits and vegetables. Investment in tangible or intangible assets	Among others, co-financing of <b>investments</b> allowing the use of <b>biological control methods</b> as an alternative to the use of plant protection products.
<b>Knowledge exchange</b>	No measures found	

## 2.2 Germany

Germany offers one agri-environment scheme AECM (EL-0102) containing multiple sub-interventions. One of them (sub-intervention EL-0102-07), contains **multiple biocontrol options** (microorganisms, semiochemicals, natural substances). It is positive to see that it is offered to arable crops, vineyards, and orchards, as well as fruit and vegetables both outdoor and in greenhouses or film tunnels. It includes targeted payments for the use of a range of particular biocontrol practices, including *Trichogramma* in maize, mating disruption by pheromone confusion, virus preparations, and various low risk biopesticides. Another encouraging sign is that **training and advisory services are offered to farmers** (both within the sectoral interventions and through the support of knowledge exchange) on the use of alternative methods and methods for chemical plant protection and IPM respectively. This in combination with the AECM supporting a wide range of biocontrol practices has a potential to become a real driver of biocontrol transition in Germany.

Important incentives are also the restrictions on pesticide use in the eco-scheme for permanent crops or arable cropping, which allows only low-risk pesticides or pesticides allowed in organic farming, and the top-up payment for no pesticide use in the agri-environment contract for management commitments for biodiversity.

**Table 2: German CSP interventions supporting biocontrol measures**

CAP intervention	Title and number of intervention	Brief description and objective of biocontrol or IPM measure
Eco-schemes	DZ-0406 – Management of permanent crops or arable without use of chemical pesticides 300	The use of only those plant protection products that contain <b>only low-risk active substances</b> under the EU Regulation on the placing of plant protection products on the market or <b>authorised for use in organic farming is permitted</b> . On summer cereals, including maize; protein crops, including quantities, other than arable fodder; summer oilseeds; root crops; field vegetables: all other pesticides shall not be used from 1 January to 31 August. On arable land used for grasses or other herbaceous forage or protein crops used as arable fodder, all other pesticides shall not be used from 1 January to 15 November.
AECM	EL-0102 — Management commitments to improve water quality  Sub-intervention EL-0102-07	In all sub-interventions of EL-0102, in order to protect and improve the status of surface waters and bodies of groundwater, different restrictions apply to the use of fertilizers and/or plant protection products up to the complete absence of the use of these substances or in <b>TI: EL-0102-07 Specifications for the application of biological and biotechnical plant protection</b>  Biological crop protection, such as beneficial use in agricultural or horticultural crops, especially in the greenhouse, is an important component of integrated pest management. Beneficial substances such as <b>egg parasites of the genus Trichogramma are important as natural opponents of numerous pests, especially of harmful butterfly species on many different crops, as well as in maize. The use of trichogramma, unlike many chemical insecticides, is absolutely environmentally friendly. There are no waiting times or requirements regarding water protection.</b>  Biotechnical plant protection, such as <b>the pheromone confusing method for the control of pests in fruit or viticulture, is already being used</b>

		<p><b>successfully.</b> The females exude pheromones to attract male animals. The confusing method is very species specific, since each species uses its own pheromones or mixtures thereof.</p> <p><b>Measures such as the establishment of bird nesting boxes, seat crutches, insect nesting aids and reading stone heaps as well as the sowing of single and perennial flower strips contribute to the targeted increase of biodiversity. They promote natural opponents of harmful organisms that are thus kept below the economic threshold.</b></p> <p>Chemical-synthetic herbicides can also be substituted by mechanical and suitable thermal methods for weed control.</p> <p>TI: EL-0102-07: Biological or biotechnical plant protection</p> <p>The following funding items are offered:</p> <p>a) <b>Use of beneficial substances</b> in the absence of the use of chemical-synthetic insecticides on the areas applied for against the same pest</p> <p>B) <b>Use of the pheromone confusing method</b> in the absence of the use of chemical-synthetic insecticides on the areas applied for against the same pest</p> <p>C) <b>Application of biological preparations</b> for the substitution of chemical-synthetic insecticides and fungicides on the areas applied for against the same pest</p> <p>D) <b>Promoting biodiversity by setting up/creating nesting boxes, crutches, insect nesting aids, rock heaps and the installation of flowering areas.</b></p>
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		<p><b>Unit amounts planned — Definition</b></p> <p>DE8-EL-0102-07-b-01 — Biological and biotechnical plant protection — Use of pheromone confusion methods</p> <p>DE8-EL-0102-07-b-02 — Biological and biotechnical plant protection — Use of pheromone confusion methods in combination with a virus method</p> <p>DE8-EL-0102-07-c-01 — Biological and biotechnical plant protection — Control of the frost strainer by Bacillus thuringiensis in fruit growing</p> <p>DE8-EL-0102-07-c-02 — Organic and biotechnical plant protection — Control of floury apple leaf liquor with Neem preparations</p> <p>DE8-EL-0102-07-c-03 — Biological and biotechnical plant protection — Control of shadraupes by Bacillus thuringiensis in vegetable farming</p> <p>DE8-EL-0102-07-c-04 — Biological and biotechnical plant protection — Control of sclerotinia by coniothyrium minitans preparations in vegetable production</p> <p>DE8-EL-0102-07-c-05 — Biological and biotechnical plant protection — Growing of daystes in strawberry herds for nemathode control</p> <p>DE8-EL-0102-07-c-06 — Biological and biotechnical plant protection — Control of apple peel wrapper by virus method — unique</p> <p>DE8-EL-0102-07-c-07 — Biological and biotechnical plant protection — Control of apple peel wrapper by virus method — twice</p>
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		<p>DE1-EL-0102-04-a-01 — E11 herbicide-free farming systems in permanent crops</p> <p>DE1-EL-0102-04-a-02 — E3 herbicide renunciation in agriculture</p> <p>DE1-EL-0102-04-a-03 — E12 fungicide renunciation in winter wheat, — spelt, — triticale cultivation</p> <p>DE1-EL-0102-04-a-04 — B7 Renouncing chemical-synthetic means of production on grassland</p> <p>DE1-EL-0102-07-a-01 — E4 Application of trichogramma in maize</p> <p>DE1-EL-0102-07-a-02 — E5 Useful use in greenhouses or film tunnels</p> <p>DE1-EL-0102-07-a-03 — E5 Useful use in greenhouses or film tunnels — combination with D2 organic farming</p> <p>DE1-EL-0102-07-b-01 — E6 use of pheromones in fruit growing</p>
<b>AECM</b>	EL-0105 – Management commitments for biodiversity	Additional payment available for no use of pesticides or plant growth regulators / restricted use of pesticides (certain pesticide groups)
<b>Sectoral interventions</b>	ADVI1(47(1)(b) — Advisory services and technical assistance, <b>in particular with regard to sustainable pest and disease control practices</b> , the sustainable use of phytosanitary and veterinary medicinal products, adaptation to climate change and mitigation, conditions of employment and	<p>Funding Opportunities</p> <p>Eligible for funding (non-exhaustive list):</p> <ol style="list-style-type: none"> <li>1. Advice and support;</li> <li>2. Training of PO members and staff;</li> <li>3. Costs of nutrient analysis and soil studies that go beyond the statutory cycle</li> </ol>

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	employer obligations, and health and safety at work.	<ol style="list-style-type: none"> <li>4. Costs for the implementation of the biolabel (under Regulation (EU) 2018/848)</li> <li>5. <b>Use of alternative methods and methods for chemical plant protection</b></li> <li>6. Use of resistant seed and planting material</li> <li>7. Precision Farming</li> </ol>
<b>Knowledge exchange</b>	Know(78) — Exchange of knowledge and dissemination of information	The advisory services and training provided to consultants shall contribute within the system to provide <b>services to advise farmers</b> and other beneficiaries of CAP support within the meaning of Article 15 of the CAP SP Regulation. They also contribute to improving knowledge of best practices in the field of biosecurity, in particular with regard to African swine fever, paludicultures, <b>pesticide management and integrated pest management.</b>

## 2.3 Denmark

**The Danish Pesticide Strategy 2017 - 2021** aims to reduce pesticide loads through long-term and targeted efforts in Denmark. This includes limited use of pesticides, supported by eco-scheme for ecological area support and the investment scheme for environmental and climate technology, in order to support EU directives on the sustainable use of pesticides. Despite Denmark's ambitious national pesticide strategy, **no concrete biocontrol measures were found in the CSP**. Inclusion of advisory services for fruit and vegetables farmers concerning sustainable pest and disease control techniques is a positive sign, however, it is impossible to assess the real incentive potential of this intervention as the detailed content of the actions and their requirements will be defined nationally in the Order and Guidance of the Scheme. Details of this Order and Guidance are not provided in the CSP.

**Table 3: Danish CSP interventions supporting biocontrol measures**

CAP intervention	Title and number of intervention	Brief description and objective of biocontrol or IPM measure
AECM	No measure found	
<b>Sectoral interventions</b>	<p>Fruit and vegetables</p> <p>ADVI1(47(1)(b)) — advisory services and technical assistance, <b>in particular concerning sustainable pest and disease control techniques</b>, sustainable use of plant protection and animal health products, climate change adaptation and mitigation, the conditions of employment, employer obligations and occupational health and safety</p> <p>TRAINCO(47(1)(c)) — - training including coaching and exchange of best practices, in particular concerning sustainable pest and disease control techniques, sustainable use of plant protection and animal health products, and climate change adaptation and mitigation, as well as the use of organised trading platforms and commodity exchanges on the spot and futures market.</p>	The detailed content of the actions and their requirements will be defined nationally in the Order and Guidance of the Scheme.
<b>Knowledge exchange</b>	No measure found	

## 2.4 Austria

Austria's CAP strategic plan offers an agri-environment scheme targeted at protected cultivation, (AECM 70-11), which supports the **use of beneficial crops and promotes microorganism type of biological control**. A positive sign is that the intervention acknowledges the need for a sound biological knowledge, a specific skillset in dealing with living organisms and several logistical requirements. There is an official register (Federal Office for Food Security) from which the farmer must choose his/her organisms and farmer gets compensated for both costs and income losses. It would be beneficial to see that this intervention is supported by training and advisory services given the knowledge/skills needs raised above.

A promising scheme is also the **sectoral intervention for wine, fruit and hops, that includes a ban on using insecticides**. It stipulates that farmers will get compensated for both lower yields (loss of income) as well additional expenditure for the alternative control of insects although there are exceptions to some pathogens when chemicals use would be allowed. The additional option to relinquish herbicide use could also support by encouraging a more diverse and flower-rich vegetation cover. **Training and exchange of best practices, in particular concerning sustainable pest and disease control techniques**, sustainable use of plant protection and animal health products, is another positive development but it is not clear how much targeted biocontrol advice is provided.



**Table 4: Austrian CSP interventions supporting biocontrol measures**

CAP intervention	Title and number of intervention	Brief description and objective of biocontrol or IPM measure
Eco-schemes	31-01 Greening of arable land – cover and catch crops and 31-02 Greening of arable land – System Evergreen	Includes <b>ban on pesticide use from the time of planting the greening</b> (intermediate or cover crops) until the end of the greening period and removal of subsidized greening crops only by mechanical methods (forage or incorporation). <u>Except</u> for variant funding for cover crops in winter oilseed rape.
AECM	Intervention 70-11 <b>Use of beneficial crops in protected cultivation</b>	<p>The measure promotes <b>the use of organisms replacing the use of plant protection products</b>. The promotion thus contributes to the protection of water from material inputs and to ensuring a high level of food safety through the control of animal pests in protected cultivation (film tunnels, greenhouses).</p> <p>In addition to reducing environmental and product loads, beneficial use is also important against the background of insecticide-resistant pest populations. The use of beneficial substances, which must be produced in the context of costly breeding, <b>requires not only a sound biological knowledge but also certain skills in dealing with living organisms</b>. In addition, many beneficial substances show a specific effect against certain pests. This usually leads to the need to use various beneficial substances during a crop season in order to be able to guarantee successful pest control. Since beneficial organisms are sensitive creatures that need to be <b>transported quickly and under suitable conditions (temperature!), this is accompanied by a high logistical effort</b>. <b>For the long-term establishment of the use of natural opponents for pest control and the associated reduction of pesticides, appropriate financial support is important</b>. The promotion of beneficial use in protected cultivation will in particular support the EU's Farm to Fork strategy. Specifically, the specific</p>

		<p>objective “reducing the use and risk of chemical-synthetic plant protection products and high-risk pesticides by 50 % by 2030” will be contributed.</p> <p>Eligible costs</p> <p><b>It promotes costs and income losses resulting from the use of organisms in protected cultivation.</b></p> <p>Requirements</p> <ol style="list-style-type: none"> <li>1. Use of organisms in the plant protection product register of the Federal Office for Food Security in at least one greenhouse or film tunnel. <b>Only applications that replace a pesticide use are eligible.</b></li> <li>2. Impact-related recording of the type and quantity of organisms used, evidence of purchase, reason and destination and date of use shall be kept.</li> </ol>
<p><b>Sectoral intervention</b></p>	<p>70-09 — relinquishment of herbicides on wine, fruit and hops</p>	<p>The <b>complete relinquishment of herbicides</b> in the contract period on the entire participating area will prevent or reduce potential material inputs in ground and surface waters. The renunciation of herbicides in fruit, wine and hop crops also promotes animal and plant diversity in permanent and special crop areas.</p> <p>By avoiding chemical-synthetic herbicides, the intervention makes an important contribution to achieving the objectives of the EU Farm to Fork and Biodiversity 2030 strategies. In particular, the aim is to reduce the use and risk of chemical-synthetic plant protection products and high-risk pesticides by 50 % by 2030.</p> <p>Promotional items</p>

		<p>Support is granted on wine, fruit and hop areas.</p> <p>Eligible costs</p> <p>It promotes costs and income losses resulting from the abandonment of herbicides used in conventional farming in wine, fruit and hops.</p>
	<p>70-10 — relinquishment of Insecticides on wine, fruit and hops</p>	<p>In the context of the intervention, <b>the use of chemical-synthetic insecticides is forbidden</b> (excluding authorized means in organic farming). On the one hand, the intervention makes an important contribution to the reduction of material inputs in basic and surface waters and, on the other hand, promotes biodiversity in fruit, wine and hop crops.</p> <p>Promotional items</p> <p>Support is granted on wine, fruit and hop areas.</p> <p>Eligible costs</p> <p>It promotes costs and income losses resulting from the renunciation of insecticides used in conventional farming in wine, fruit and hops.</p> <p>Requirements</p> <p>1. <b>Complete relinquishment of insecticides (with the exception of resources provided for in Regulation (EU) 2018/848)</b> during the contract period on all wine, fruit and hop areas of the holding. In the case of a measure ordered by the authorities to control harmful pathogens, such as the American grapevine, the use of the officially approved active substance for control purposes is permitted and shall not be considered as an insecticide. The arrangement and operation shall be documented accordingly.</p>

		<p>The calculation elements of the intervention are composed as follows:</p> <ul style="list-style-type: none"> <li>• Low yields (qualitative and quantitative) due to increased infestation by insects</li> <li>• <b>Additional expenditure for the alternative control of insects, offsetting the savings resulting from the elimination of chemically synthetic insects.</b></li> </ul>
	<p>Fruit and vegetables</p> <p>47-16 — <b>Reduction of pesticide use</b></p>	<p>Beneficiaries/promoters</p> <p>Producer organizations (and their member companies); Associations of producer organizations</p> <p>Promotional items</p> <p><b>(1) Use of alternative methods and methods for chemical-synthetic plant protection</b></p> <p>In order to avoid or reduce the pollution of the environment with chemical-synthetic plant protection products, the use of <b>“non-chemical methods”, such as the use of protective nets, beneficial substances and the use of biological plant protection products, and the use of pheromone traps</b> to control/reduce the use of PSMs is a significant contribution. Other alternatives to chemical-synthetic plant protection include the installation of special tissue/gaze in the ventilation flaps of greenhouses, chopping equipment and other tillage equipment for mechanical weed control as well as mice traps.</p> <p><b>(3) Use of environmentally friendly cultural processes</b></p>

		<p>By using alternative crop methods, for example the total wetting of fruit crops, chemical-synthetic plant protection products can be saved. In addition, the purchase of tunnels for protected berry fruit cultivation with the aim of saving PSM as well as the purchase of compost spreaders to activate soil life (and abandoning the use of artificial fertilizers) are eligible.</p>
	<p>TRAINCO(47(1)(c)) — Training including <b>coaching and exchange of best practices, in particular concerning sustainable pest and disease control techniques, sustainable use of plant protection</b> and animal health products, and climate change adaptation and mitigation, as well as the use of organised trading platforms and commodity exchanges on the spot and futures market</p>	<p>Consultation, training and exchange of best practices with a view to modern market orientation can further improve the position of producer organizations in the food supply chain. The intervention offered shall pursue the specific objective 3 (improving the position of farmers in the value chain) referred to in Article 6(1)(c) and the cross-cutting objective.</p> <p>Beneficiaries/promoters</p> <p>Producer organizations (and their member companies); Associations of producer organizations</p>
	<p>47(1)(d)) — organic or integrated production</p>	<p>In line with the overarching EU requirements and objectives under the new CAP, the environment and the careful use of resources are given a high priority. Furthermore, the reduction of chemical pesticides and fertilizers will be further accelerated. This supports measures significant increase in the proportion of organically produced products.</p> <p>Beneficiaries/promoters</p> <p>Producer organizations (and their member companies); Associations of producer organizations</p> <p>Promotional items</p>

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		<p>(1) Actions to support organic production</p> <p>1. <b>Special counselling and support as well as other training and further training measures on organic cultivation and processing of organically produced products</b></p> <p>(2) Certification costs (initial certification and annual control costs)</p>
<b>Knowledge exchange</b>	No measures found	

## 2.5 Spain

The Spanish CSP offers several Pillar II interventions that can support pesticide use reduction and biocontrol, the most promising being the agri-environment scheme (AECM 6501.7) concerning **alternatives to chemical pest control**. The intervention supports farmers in applying various **biocontrol practices** and covers a wide range of crops - fruit trees, vineyards, olive groves, citrus, ornamentals, extensive crops, vegetables and rice (in the case of Aragon). Another positive sign is that at least 80% of the area subject to the original commitment has to be maintained in subsequent years and it is an additional option to organic farming, meaning farmer can apply for both types of support. The fact that a need to provide advisory support to farmers applying these new methods is spelled out is another positive development. No further details are provided thus making it difficult to assess the full potential of this intervention.

**Table 5: Spanish CSP interventions supporting biocontrol measures**

CAP intervention	Title and number of intervention	Brief description and objective of biocontrol or IPM measure
Eco-schemes	No measures found	
AECM	6501.1 - Agri-environmental commitments on agricultural land <b>Integrated production</b>	<p>The aim of integrated production is to promote biodiversity, improve the efficiency of natural resources and reduce water and soil pollution. It promotes the adoption of plant production methodologies that make maximum use of natural resources and production mechanisms in order to ensure, in the long term, sustainable agriculture and the protection of natural resources, introducing <b>biological</b> and chemical <b>control</b> methods and other techniques that reconcile the demands of society, environmental protection and agricultural productivity, as well as the operations carried out for the handling, packaging, processing and labelling of plant products covered by the system.”</p> <p>The following limitations, among others, shall be taken into account for the calculation of the premium:</p> <ul style="list-style-type: none"> <li>• crop loss</li> <li>• elimination of phytochemicals: appropriate tillage and <b>biological control</b></li> <li>• increased management costs,</li> <li>• the costs arising from greater individualized dedication, depending on the type of crop.</li> <li>• the need for training,</li> <li>• Displacement</li> </ul> <p>(this measure is only implemented by four Autonomous Communities: Basque Country, Extremadura, Balearic Islands and Canary Islands)</p>



	<p>6501.6 - Agri-environmental commitments on agricultural land. Maintenance or enhancement of traditional habitats and farming activities that preserve biodiversity</p>	<p>The main aim of this intervention is to promote and preserve landscapes and habitats through the introduction, conservation and maintenance of different crops, most of them traditional, which have a special uniqueness and are essential for the conservation of the genetic heritage.</p> <p>Specific commitment of the Autonomous Community of Madrid for this intervention:</p> <p>“Maintenance of traditional olive grove plantations, carrying out pruning, fertilizing and treatments following <b>Integrated Pest Management</b> criteria, under the advice of an advisor registered in the Official Register of Producers and Operators of Phytosanitary Defense Means (ROPO) as an advisor in integrated pest management.”</p>
	<p>6501.7 - Agri-environmental commitments on agricultural land (6501.7 IACS). <b>Alternative to chemical pest control</b></p>	<p>The aim of this operation is to reduce the use of chemical products by promoting the use of alternative systems to chemical control of pests, diseases and weeds in fruit trees, vineyards, olive groves, citrus, ornamentals, extensive crops, vegetables and rice (in the case of Aragon). These alternative systems include, among others, <b>biological</b> and technological <b>control</b> systems, <b>sexual confusion and mass trapping</b>. This intervention is complementary to the organic farming intervention (6503), which also addresses the alternative to chemical pest control. <b>Given the complexity and in some cases the novelty of these alternative systems, there is a need to provide support to farmers applying these new methods by technical advisors.</b>”</p> <p>Commitments (general ones, specific commitments apply to the 4 Autonomous Communities implementing the measure):</p> <ul style="list-style-type: none"> <li>• “Alternative techniques to chemical pest and disease control are used, such as sexual confusion with pheromones, mass trapping and attract</li> </ul>

	<p>6503 - Agri-environmental management commitments in organic farming</p>	<p>and kill systems, biological control, physical methods such as solarization or artificial intelligence for mechanical weeding.”                      “At least 80% of the area subject to the original commitment shall be maintained in subsequent years.”</p> <p>Through this intervention, an area payment will be granted to beneficiaries who commit themselves to adopting the practices and production methods defined in Regulation (EU) 2018/848 of the European Parliament and of the Council on organic production and labelling of organic products, encouraging both the maintenance and the conversion of production. At least 80% of the area subject to the original commitment shall be maintained in subsequent years.</p> <p>Premiums are estimated based on costs and income losses resulting from the commitments, which can be:</p> <ul style="list-style-type: none"> <li>• Production costs (seeds, organic fertilization and other raw materials) and additional costs for phytochemical removal: appropriate tillage and <b>biological control</b>.</li> <li>• Additional costs due to increased working hours resulting from compliance with the obligations and recommendations set out in the standards.</li> </ul> <p>Machinery costs</p>
<p><b>Sectoral interventions</b></p>	<p>INVRE(47(1)(a)) - investments in tangible and intangible assets, research, innovative and experimental research and production methods, as well as other actions</p>	<p>Under the “non-exhaustive” list of actions and expenditure that can be covered by this type of intervention“:</p> <p>(i) soil conservation, in particular enhancement of the carbon content of the soil</p>

		<p>A.i.10 Specific cost of organic fertilisers and <b>biostimulants</b></p> <p>A.i.15 <b>Biostimulant</b> Products with or without micro-organisms</p> <p>(ix) reduce the risks and impacts arising from the use of pesticides</p> <p>A.ix.22 <b>Use of non-mycorrhizal micro-organisms: bacteria and fungi</b> that favor the supply or assimilation of nutrients to plants; that favor a plant response to abiotic stress or that are effective in <b>biological control</b>.</p> <p>A.ix.23 Investments and operating costs in Insectaries and <b>Biological Pest Control</b> Facilities</p>
<b>Knowledge exchange</b>	No measures found	

## 2.6 Poland

**The eco-scheme on biological crop protection** using microorganisms looks promising, as it offers an option for farmers to try out biocontrol without having to make a 5 year commitment. However, the scheme is without “teeth” as farmers will still receive the payment if the biocontrol fails and they use chemical pesticides. The scheme is not tied to any other direct incentives for farmers to achieve pest control without chemicals, notably a provision of advice and training. The successful use of biocontrol often takes more than one cropping season to be optimized, and this scheme risks losing farmers who fail to achieve success in the first season.

A second eco-scheme on **Producing plant production in the Integrated Plant Production system** requires farmers to work **under the supervision of certification bodies**. Compliance with the criteria will be **the issuance of a certificate of the national quality system** — Integrated Plant Production (IP). Farmers need to comply with the principles of integrated pest management, strengthened by mandatory application of plant protection methods alternative to chemical methods, **in particular biological methods**. However, Integrated Production is not yet very popular in Poland. Until now, a farmer obtaining an IP certificate could claim a part of the cost of obtaining it and could continue to claim these costs for the first few years of such practice (the certificate has to be renewed every year). Farms with the certificate could sell products slightly more expensively than conventionally grown products. Fruits (especially apples) are most often produced in such a system in Poland. Polish consumers have, however, very little knowledge of this certificate and do not specifically look for such products<sup>18</sup>.

The benefit of this eco-scheme is that it attempts to **popularize this production system within farmers/farms** and although obtaining IP certificate is less demanding than organic, the scheme nevertheless offers some benefits for biodiversity and soil conservation. The eco-scheme does not mention biocontrol but it certainly falls within the IP and it is recommended to be used. Another benefit is that farmers **can claim the cost for certificate for multiple years** even though the eco-scheme is for one year to begin with.

The sectoral intervention for fruit and vegetable farmers providing finances for machinery or equipment for precise use and consumption reduction of plant protection products (e.g. sensory or recirculating sprayers), aerial cultivation, for

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<sup>18</sup> Country-specific information provided by Aleksandra Krol from the Polish Society for the Protection of Birds (OTOP)

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mechanical or biological control of weeds or pests (e.g. devices for mechanical pest destruction) is a positive signal since farmers will need to invest when shifting to various biocontrol measures and depending on the size of their farms, these investments can be substantial. All other AECM referring to IPM promotion would need further elaboration in the Plan, detailing what they entail and detailed control and monitoring mechanisms.

**Table 6: Polish CSP interventions supporting biocontrol measures**

CAP intervention	Title and number of intervention	Brief description and objective of biocontrol or IPM measure
Eco-schemes	<p><b>4.4 eco-scheme — Biological crop protection</b></p> <p>Eco-scheme(31) — Schemes for the climate, the environment and animal welfare/Art. 31(7)(a)</p>	<p>The intervention consists of the use of a plant protection product <b>containing micro-organisms on a given crop as active substances</b>. Microbiological preparations must be registered as plant protection products authorized by a permit of the Minister of Agriculture and Rural Development. Performing the procedure with a biological preparation will eliminate the need for a chemical procedure. Chemical protection will only be authorized as a last resort when it is not possible to eliminate pathogens through microbiological preparations. Details on the applicability of chemical protection will be defined at the level of national legislation.</p> <p>Currently, there are <b>45 registered microbiological preparations (i.e. containing fungi, bacteria, viruses) that can be used on fruit crops, berry, vegetable and field crops</b>. The treatment will be performed on crops established on all types of land, including fruit trees grown on permanent grassland in agroforestry systems.</p> <p>Currently, there is no palette of biological plant protection products allowing full protection of crops, <b>therefore the use of chemical protection will not be prohibited under the eco-scheme</b>.</p> <p>The aim of the intervention is to reduce the use of chemical plant protection products, which will have a positive impact on the protection of biodiversity and reduce the deposition of chemical plant protection products to the environment.</p>

		<p>The support will <b>help to alleviate the difficulties encountered in bio-protected crop production.</b></p> <p>Practice goes <b>beyond national rules and conditionality because no legislation imposes an obligation to use biological methods of protection. When entering the eco-scheme, the farmer will be obliged to apply a plant protection treatment using biological plant protection using microbiological preparations.</b></p>
	<p>4.3 — eco-scheme — <b>Producing plant production in the Integrated Plant Production system</b></p>	<p>The aim of the intervention is to provide aid to cultivate crops in a given year in accordance with the <b>methods of integrated plant production under the supervision of certification bodies.</b> Compliance with the criteria will be <b>the issuance of a certificate of the national quality system</b> — Integrated Plant Production (IP).</p> <p>compliance with the principles of integrated pest management, strengthened by mandatory application of plant protection methods alternative to chemical methods, <b>in particular biological methods,</b> and reducing the range of plant protection products by those that have the most negative impact on the environment, agrotechnical treatments replacing the use of herbicides pre- and downstream, use of varieties resistant to diseases, pests or water shortages.</p>
<p><b>AECM and investments</b></p>	<p>10.4. — Investments contributing to environmental and climate protection</p> <p>Invest(73-74) — Investments, including investments in irrigation</p>	<p>The intervention will support tangible or intangible investments aimed at:</p> <p>Mechanical or <b>biological fight against weeds or pests</b> (e.g. devices for mechanical pest destruction),</p>

	<p>ENVCLIM(70) — Environmental, climate-related and other management commitments</p> <p>8.11. — Organic farming</p>	<p>ORGANIC PRODUCTION — PLANT PROTECTION PRODUCTS</p> <p>The prevention of damage caused by pests and weeds consists primarily in the protection of:</p> <ul style="list-style-type: none"> <li>- <b>their natural enemies,</b></li> <li>- selection of species, varieties and heterogeneous material,</li> <li>- crop rotation,</li> <li>- <b>cultivation techniques such as biofumigation, mechanical and physical methods,</b> and</li> <li>- thermal processes such as solarisation and, in the case of crops under cover, shallow steam treatment of soil (up to a maximum depth of 10 cm).</li> </ul> <p>— requirements include the rules for the use of plant protection products, <b>including integrated pest management, in order to minimize the negative impact on biodiversity.</b></p>
	<p>ENVCLIM(70) — Environmental, climate-related and other management commitments</p> <p>8.9.1. — Agri-environment-climate commitments implemented under the agri-environment-climate measure of the RDP 2014-2020. Package 4.</p> <p><b>Price habitats and endangered bird species in Natura 2000 sites</b></p>	



	<p>8.9.2. — Agri-environment-climate commitments implemented under the agri-environment-climate action of the Rural Development Programme 2014-2020 (RDP 2014-2020). Package 5. <b>Valuable habitats outside Natura 2000 sites</b></p> <p>8.4. — Preservation of orchards of traditional varieties of fruit trees</p> <p>8.7. Biodiversity on arable land</p> <p>AND 8.3. Extensive use of meadows and pastures in Natura 2000 sites</p> <p>8.2. — Conservation of valuable habitats and endangered species outside Natura 2000 sites</p>	<p>requirements on the rules for the use of plant protection products, <b>including integrated pest management</b>, in order to minimize the negative impact on biodiversity</p>
<p><b>Sectoral interventions</b></p>	<p>1.7.5. — Action to protect the environment and mitigate climate change</p> <p>INVRE(47(1)(a)) — investments in tangible and intangible assets, research and experimental and innovative production methods and other actions</p>	<p>The aim of the intervention is to involve the fruit and vegetables sector in environmental protection and climate change mitigation measures. .</p> <ul style="list-style-type: none"> <li>- machinery or equipment for low-emission application of fertilizers (e.g. soil application, application of fertilizers using digital solutions), precise use and consumption reduction of plant protection products (e.g. sensory or recirculating sprayers), aerial cultivation, <b>for mechanical or biological control of weeds or pests</b> (e.g. devices for mechanical pest destruction).</li> </ul>
<p><b>Knowledge exchange</b></p>	<p>No measure found</p>	

## 2.7 The Netherlands

There are no specific eco-schemes in the eco-schemes chapter of the Strategic Plan. They are referred to in Planned interventions and outputs section, but not described further in the relevant sections. It is assumed the link is made based on Commission's recommendations to the Netherlands.

Despite the fact that the Netherlands has a national biocontrol plan, **no measures for its support are detailed in the CSP.**

The only intervention which could potentially support biocontrol uptake are the RDP interventions under the Cooperation support for chains, sectors, sustainable food, CAP pilots and innovation European Innovation Partnership (EIP). Generally, collective approaches can be understood as actions taken by a group of farmers (and stakeholders) who jointly apply to participate in an environmental and climate commitment or an eco-scheme, therefore providing higher levels of environmental public goods and ecosystem services through landscape-level implementation.

The main objective of this intervention is to develop innovations into a mature product (or service) and to actively communicate it to the target group for which it has been developed. In order to be eligible for aid, the application has to be made by a partnership (Operational group) composed of at least two participants, one of which must be a farmer and one or more participants from the following categories: Farmers; Actors in the agri-food chain; Other SMEs; Members of producer groups, cooperatives, or interbranch organizations; Informers; Knowledge and educational institutions; Other natural and legal persons who actively contribute to the purposes of the application. Although biocontrol is not specifically spelled out, as it is an innovative approach to pest management, this intervention could provide a potential source of funding to support farmers' and other stakeholders' collaborative efforts to develop and disseminate knowledge about biocontrol practices.

**Table 7: Dutch CSP interventions supporting biocontrol measures**

CAP intervention	Title and number of intervention	Brief description and objective of biocontrol or IPM measure
<b>Eco-schemes</b>	2.3.2 Planned interventions and outputs with a direct and significant link to result indicators.  2.1.SO5.1.5 Other comments	The list of 26 possible measures for the eco-scheme includes 10 measures contributing to the reduction of use and risks of plant protection products <b>and the promotion of non-chemical measures and integrated pest management</b> . These measures are as follows: 1. rest crop; 7. Buffer strip with herbs; 10. Standard cultivation; 15/16. no use of herbicides (glyphosate) when working under a rest crop or grass soda; 18. <b>biological control</b> ; 22/23. woody elements; 25. nonproductive field(rand) and 26. organic farm.  The list of 26 possible measures for the eco-scheme includes 10 measures contributing to the reduction of use and risks of plant protection products and the promotion of non-chemical measures and integrated pest management. These measures are as follows: 1. rest crop; 7. Buffer strip with herbs; 10. Standard cultivation; 15/16. no use of herbicides (glyphosate) when working under a rest crop or grass soda; 18. biological control; 22/23. woody elements; 25. nonproductive field(rand) and 26. organic farm.
<b>AECM</b>	No measures found	
<b>Sectoral interventions</b>	No measures found	
<b>Cooperation</b>	I.77.1 — Cooperation for chains, sectors, more sustainable food, CAP pilots and innovation EIP	The main objective of this intervention is to develop innovations into a mature product (or service) and to actively communicate it to the target group for which it has been developed.  Key innovation themes are:

		<ul style="list-style-type: none"> <li>- sustainable added value chain where one or more farmers, together with one or more economic operators, develop (through) a (part of) a chain, from idea to a mature concept or product;</li> <li>- Digitalization;</li> <li>- Policy pilots, including:</li> <li>- Pilots of animal-related eco-schemes with a focus on animal welfare;</li> <li>- <b>Resilient crops/reduction of plant protection products;</b></li> <li>- Short chains;</li> <li>- <b>Organic farming in the chain;</b></li> <li>- <b>More sustainable food systems</b></li> </ul> <p>Connection to the EIP network and other innovation and knowledge networks contribute to ensuring that the partnerships can make use of available knowledge and experience throughout the project for greater effectiveness.</p> <p>This intervention is complementary to the interventions “Investments for farm modernization” and “knowledge and information” which should help to enable or accelerate the widespread uptake of these innovations if this is not sufficiently autonomous (such as market-driven). As a result, these three types of interventions are complementary with each other.</p>
<b>Knowledge exchange</b>	No measures found	

### 3. RECOMMENDATIONS ON HOW CAP STRATEGIC PLANS INTERVENTIONS COULD BE BETTER PROGRAMMED FOR BIOCONTROL AND INTEGRATED PEST MANAGEMENT SUPPORT

This section provides recommendations on how the CAP Strategic Plans should be adjusted to support and promote higher biocontrol uptake by farmers. We list six thematic areas for improvement based on the analysis of the national CSPs including the relevant examples. We highlight some promising approaches that have the potential to support the wider uptake of biocontrol practices, provided that they are accompanied by supporting measures and opportunities that support farmers in the transition and in maintaining satisfactory levels of control.

The areas for improvement of CAP Strategic Plans support for biocontrol identified in this report are:

#### **1. Support targeted advisory services and knowledge exchange between farmers**

Article 15 of the CAP Regulation requires Member States to provide for farm advisory services. This article is however more general and gives Member States flexibility to select the focus of the advisory services covering economic, environmental and social dimensions, and taking into account existing

farming practices. Thus, IPM/biocontrol advisory services can potentially to be funded under this intervention, however, without specific requirements the potential remains small. There is also the CAP intervention for sectoral support for fruit and vegetables sector, the hops sector, the olive oil and table olives sector which provides for advisory services and technical assistance in particular concerning sustainable pest and disease control techniques, sustainable use of plant protection and animal health products. However, this support is optional and is often described rather vaguely in the CSPs as support for sustainable pest control in general. It would be beneficial if targeted training was provided for each intervention supporting biocontrol measures as it takes time to shift to a more holistic approach to farming and farmers need to learn how to implement biocontrol practices. The opportunity is nevertheless there to provide targeted training on biocontrol practices.

The CAP also provides an intervention to fund knowledge exchange and dissemination (Article 78 of the CAP Regulation). This support goes further than the mandatory farm advisory services in Article 15, by supporting farm to farm

exchanges, peer learning networks, and researcher-farmer interactions, and has thus much greater potential to bring about a positive change. It can support farmers to farmers networks, collaborative efforts and bottom -down learning processes. However, this intervention has often been allocated a very small budget and few details of priorities are provided in the plans. Those that are using it do not necessarily target support to environmental and climate objectives, instead supporting knowledge exchange measures for human capital improvements and to reach all the objectives of the CAP. This leaves the initiative with individual farmers to choose to apply for funding for knowledge exchange on biocontrol, without providing an active steer. Similarly, to the advisory services above, this intervention represents an opportunity, but it is as for now not widely used and targeted to biocontrol support.

A positive example comes from **German agri-environment scheme 'Management commitments to improve water quality'** and particularly sub-intervention EL-0102. The sub-intervention contains multiple biocontrol options and it is offered to fruit, vegetables as well as cereal farmers. Training and advisory services are offered to farmers both within Sectoral and Knowledge and exchange interventions on the use of alternative methods and methods for chemical plant protection and IPM respectively.

## 2. Support investments in specific techniques

The CSP can offer investment support within sectoral interventions as well as in the investment support intervention. These are important interventions for biocontrol since farmers will need to invest when shifting to various biocontrol practices and depending on the size of their farms, these investments can be substantial. For the wide biocontrol uptake to be successful these investments are crucial, and Member States have to offer targeted financial support available to farmers.

A positive example is seen in **France's operational programme for fruits and vegetables** providing 'Investment in tangible or intangible assets'. This intervention offers co-financing of investments supporting the use of biological control methods as an alternative to the use of plant protection products. Another positive example comes from **Spain's sectoral intervention in fruit and vegetables** (INVRE(47(1)(a))). Under this intervention there is a non-exhaustive list which includes financial support to purchase of non-mycorrhizal micro-organisms such as bacteria and fungi as well as investments and operating costs in Insectaries and Biological Pest Control Facilities. Lastly, the Polish Plan provides investment support aimed at the mechanical or biological fight against weeds or pests (e.g. devices for mechanical pest destruction).

### **3. Provide support for specific biocontrol practices within the general pesticides' reduction support**

In order to drive the real change in biocontrol uptake, CSPs need to provide for targeted support to biocontrol practices as already seen on examples from a number of assessed CSPs. Measures supporting more general pesticide reduction are naturally positive, however, without specifying what practice the intervention is aimed at, they provide less targeted support and smaller chance that biocontrol will be chosen.

**The German agri-environment scheme** mentioned above (sub-intervention EL-0102) in particular stands out as it contains multiple biocontrol options (microorganisms, semiochemicals, natural substances) and it is offered to fruit, vegetables as well as cereal farmers. The CSP lists individual biocontrol options in detail, unlike the other assessed Member States Plans. As stated above, this scheme together with the training on the use of alternative methods and methods for chemical plant protection and IPM has a good potential to increase biocontrol use in Germany. Another good example is the **Austrian agri-environment scheme targeted at protected cultivation** (AECM 70-11), which supports the use of beneficial crops and promotes microorganism type of biological control. A positive sign is that the intervention acknowledges the need for a sound biological knowledge, a specific skillset in dealing with living organisms and several logistical requirements.

### **4. Include clear and strong incentives to learn and progress in the transition to biocontrol and IPM**

Although some schemes look ambitious and promising in their titles, closer analysis of their requirements shows that they are often a missed opportunity. This is an example of the **Polish eco-scheme on biological crop protection** using microorganisms which looks promising from the outset, however without "teeth" as chemicals can still be used when the biocontrol measure fails to work. The scheme offers a relatively easy entry for farmers to try out biocontrol for a season without too much risk, but at the same time, it does not encourage farmers to persevere if they fail during the first year. Farmers will only be motivated to continue with the eco-scheme for the five years of the plan if they are also provided with access to advice and knowledge exchange that will help them to make the adjustments to their farming system needed to ensure biocontrol use is optimized. The Polish eco-scheme provides an opportunity for new farmers to try out biocontrol but needs to be linked to a longer-term support that encourages farmers to try again, to learn, and in time to commit to a longer-term commitment under an agri-environment contract. In contrast, **another Polish eco-scheme that requires participating farmers to have a certificate** under

the national quality system for Integrated Plant Production (IP) is potentially longer lasting, as this certificate has to be renewed every year, but farmers can also claim the cost associated with obtaining this certificate for more years.

### **5. Ensure attractive benefits attached to certification schemes linked to biocontrol practices**

Interventions that support farmers to obtain a certificate of IPM or integrated production has the advantage of providing a potential added value to the farm product, and of using the certification body to control and verify compliance with the standard. To be effective, the scheme should include cost incurred to comply with the higher standards, the process of obtaining the certificate, promotion of this scheme amongst consumers to ensure higher visibility and awareness, and strict monitoring and enforcement requirements to ensure the high standards are complied with. Eco-schemes using certification should provide a stronger incentive to continue for more than one season, both because of the greater effort and cost needed to obtain the certification, and because of the potential for increasing the value of the farm produce. The degree to which the certification will increase biocontrol use and reduce pesticide use depends on how much the certificate standards and thresholds differ from conventional practice.

The example is the **Polish eco-scheme on Producing plant production** in the Integrated Plant Production system where participating farmers receive a certificate of the national quality system — Integrated Plant Production (IP). Although farmers can also claim the cost associated with obtaining this certificate for more years, the certificate is not widely known amongst consumers which can lead to lower interest by farmers. Farmers would have much more motivation if the CSP offered more attractive benefits attached to the scheme and generally ensured higher visibility to such production.

### **6. Focus on providing support to longer - term schemes and provide support for innovation and pilots**

Introducing a biocontrol practice into a farming system will only work if wider changes are made within an IPM framework and requires farmers to start a transition process that can take several seasons of learning and adapting. Healthy and resilient farmland ecosystem is a prerequisite for a successful implementation of biocontrol practices as healthy soils and biodiversity are needed for practices to work in a long run. Naturally, interventions which provide multiple year support will have better chances of success as shorter commitments might not work thus potentially discouraging farmers to continue with the transition. Pillar II measures provide for this several years support and their inclusion of biocontrol is thus crucial. Although eco-schemes are for shorter maximum 24 months year



commitments, making them sufficiently attractive to farmers to continue for the next season, could also be a good option to support biocontrol uptake.

Positive example is found in the **Spanish CSP, namely in the agri-environmental commitments on agricultural land** (6501.7). This RDP intervention concerning alternative to chemical pest control provides supports farmers in applying various biocontrol practices and covers wide range of crops - fruit trees, vineyards, olive groves, citrus, ornamentals, extensive crops, vegetables and rice (in the case of Aragon). Another positive sign is that at least 80% of the area subject to the original commitment has to be maintained in subsequent years and it is an additional option to organic farming.

In the longer term, farmers need access to advice and innovation and research results to help find solutions to new pest outbreaks, due to newly introduced invasive pests, or by pests shifting target and abundance in response to climate change. CAP Strategic Plans can fund operational groups and pilot projects developing or rolling out innovative practices and new approaches. A good example of this kind of support comes from the **Dutch CSP and its RDP interventions under the Cooperation support** for chains, sectors, sustainable food, CAP pilots and innovation European Innovation Partnership (EIP). The main objective of this intervention is to develop innovations into a mature product or service and to actively communicate it to the target group for which it has been developed. Although biocontrol is not specifically spelled out, as it is an innovative approach to pest management, this intervention could provide a potential source of funding to support farmers' and other stakeholders' collaborative efforts to develop and disseminate knowledge about biocontrol practices. Specifically for biocontrol, this kind of support would be extremely useful as it would not only showcase new methods used and overcome challenges in implementation but would also include the essential element of active dissemination amongst farmers.

Based on the analysis carried out it is clear that in order to guarantee wider uptake of biocontrol practices by farmers in the near future, the CSPs need to be amended and improved in the years to come. They need to provide attractive funding for concrete biocontrol practices accompanied by targeted advisory and consulting services, access to peer-to-peer learning and experience exchange, and continuous awareness raising about long-term benefits of reducing pesticides use and switching to nature-friendly practices.

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