

Pe'er, Guy; Birkenstock, Maren; Lakner, Sebastian; Röder, Norbert

Working Paper

The Common Agricultural Policy post-2020: Views and recommendations from scientists to improve performance for biodiversity. Volume 2 - Annexes

Thünen Working Paper, No. 175 - Volume 2

Provided in Cooperation with:

Johann Heinrich von Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries

Suggested Citation: Pe'er, Guy; Birkenstock, Maren; Lakner, Sebastian; Röder, Norbert (2021) : The Common Agricultural Policy post-2020: Views and recommendations from scientists to improve performance for biodiversity. Volume 2 - Annexes, Thünen Working Paper, No. 175 - Volume 2, ISBN 978-3-86576-225-2, Johann Heinrich von Thünen-Institut, Braunschweig, <https://doi.org/10.3220/WP1620647428000>

This Version is available at:

<https://hdl.handle.net/10419/234607>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

**The Common
Agricultural Policy
post-2020: Views and
recommendations from
scientists to improve
performance for
biodiversity
Volume 2 – Annexes**

**Guy Pe'er, Maren Birkenstock,
Sebastian Lakner, Norbert Röder**



Thünen Working Paper 175

Dr. Guy Pe'er

German Centre for Integrative Biodiversity
Research (iDiv) Halle-Jena-Leipzig and
UFZ – Helmholtz Centre for Environmental
Research, Dept. Ecosystem Services
Puschstraße 4
D-04103 Leipzig

Prof. Dr. Sebastian Lakner

University of Rostock
Justus-von-Liebig-Weg 7
D-18059 Rostock

M. Sc. Maren Birkenstock und Dr. Norbert Röder

Thünen Institute of Rural Studies
Johann Heinrich von Thünen Institute
Federal Research Institute for
Rural Areas, Forestry and Fisheries
Bundesallee 64
D-38116 Braunschweig

Phone: +49 531 596-5240

Fax: +49 531 596-5599

E-Mail: maren.birkenstock@thuenen.de

Thünen Working Paper 175 – Volume 2

Braunschweig/Germany, May 2021

Workshop leads

Austria: Stefan Schindler¹

Bulgaria: Yanka Kazakova²

Croatia: Sonja Karoglan Todorovic³

Cyprus: Menelaos Stavrinides⁴, Ioannis Vogiatzakis⁵

France: Herve Guyomard⁶

Germany: Guy Pe'er, Maren Birkenstock, Norbert Röder, Sebastian Lakner

Ireland: Alan Matthews⁷, John Finn⁸

Italy: Davide Viaggi⁹, Stefano Targetti⁹

Poland: Edward Majewski¹⁰

Slovakia: Peter Bezák¹¹, Jana Špulerová¹¹

Slovenia: Tanja Šumrada¹², Ilona Rac¹²

Spain: Mario Diaz¹³, Elena D. Concepción¹³, Manuel B. Morales¹⁴

Sweden: Juliana Dänhardt¹⁵, Lovisa Nilsson¹⁵

¹) Umweltbundesamt, ²) University of National and World Economy Department of Economics of Natural Resources,

³) Environmental Institute ECOLOGICA, Croatia, ⁴) Cyprus University of Technology, Department of Agricultural Sciences, Biotechnology and Food Science, ⁵) Open University of Cyprus, ⁶) Institut national de recherche pour l'agriculture, l'alimentation et l'environnement – INRAE, ⁷) Trinity College, Dublin Department of Economics,

⁸) Teagasc, Crops, Environment and Land Use Programme, ⁹) Alma Mater Studiorum Università di Bologna Department of Agricultural and Food Sciences, ¹⁰) Warsaw University of Life Sciences - SGGW Faculty of Economic Sciences, ¹¹) Slovak Academy of Science, Institute of Landscape Ecology, ¹²) University of Ljubljana Biotechnical faculty, ¹³) Museo Nacional de Ciencias Naturales (CSIC) Biogeografía y Cambio Global, ¹⁴) Department of Ecology, Facultad de Ciencias, Universidad Autónoma de Madrid, ¹⁵) University of Lund Centre for Environmental and Climate Science

Abstract

Despite significant efforts, investments and some local successes, the EU's Common Agricultural Policy (CAP) has not succeeded in halting the loss of farmland biodiversity. To address this (and other) weaknesses, the CAP post-2020 proposes a new "Green Architecture" comprising (inter alia) compulsory elements (enhanced conditionality through Good Agricultural and Environmental Conditions - GAEC), voluntary Agri-Environment-Climate Measures (AECMs), and a new instrument called "Eco-schemes". Will this new Green Architecture, combined with a result-based orientation of the CAP, help address the biodiversity crisis?

To provide science-based feedback on this proposal, more than 300 scientists from 22 Member States (MSs) have provided their expertise through 13 workshops that took place between October and December 2020, and a follow up online survey. The results are published in Thünen Working Reports with 3 volumes.¹ The Thünen Working Paper 175 – Volume 1 contains all results of the workshops with experts' assessment.² **The present Thünen Working Paper 175 – Volume 2 contains all reports of the Member-State-Workshops as well as an overview of the experts' opinions on the Flagship-Eco-schemes** proposed by the EU Commission. In addition, a policy brief on the results was published in Thünen Working Paper 175 – Volume 3.³

Keywords: CAP, Common Agricultural Policy, AECM, Eco-schemes, European Union, Biodiversity

JEL: Q15, Q18, Q57, Q58

¹ Thünen Working Papers cover selected subjects from the present research of the Thünen Institutes and are not peer-reviewed

² https://www.thuenen.de/media/publikationen/thuenen-workingpaper/ThuenenWorkingPaper_175_Vol1.pdf

³ https://www.thuenen.de/media/publikationen/thuenen-workingpaper/ThuenenWorkingPaper_175_Vol3.pdf

Contributions funding information and acknowledgements

In co-operation with DG AGRI and the office of European Commission Executive Vice-President Frans Timmermans, this independent study was led by the German Centre for integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig, & UFZ - Helmholtz Centre for Environmental Research, Thünen Institute of Rural Studies and University Rostock. The study was conducted voluntarily by all participating scientists. Guy Pe'er is funded by iDiv's strategic project iCAP-BES: "Impacts of the Common Agricultural Policy on Biodiversity, Ecosystem Services and people" (under DFG – FZT 118, 202548816; www.idiv.de/de/icap-bes).

Contributions: Guy Pe'er led the initiative and developed the synthesis report. Maren Birkenstock coordinated the workshops, designed and implemented the online survey. All authors contributed to writing and editing the document. The report has also been reviewed and further edited by John Finn, Herve Guyomard, Alan Matthews, and Mario Diaz. Norbert Röder and Juliana Dänhardt contributed to the climate chapter.

Workshop coordinators wrote their respective country reports, with minimum editing and interventions by the authors.

We are thankful to all workshop participants and the individuals contributing to the online survey, for having provided their valuable knowledge and expertise. In addition, we would like to thank Manuela Schoon and Sandra Göbbels (both: Thünen Institute of Rural Studies) for their support in editing the document.

Table of Contents

Workshop leads	i
Abstract	ii
Contributions funding information and acknowledgements	iii
Table of Contents	I
ANNEX I: FULL COUNTRY REPORTS	I
Reply Bulgaria	1
Q1: How can the different Green-Architecture elements optimally complement each other? (What key factors and considerations should be made in ensuring the Green Architecture operates best?)	1
Q2: What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?	11
Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?	19
Q4: How can science contribute on indicators and the way they are used for performance evaluation of the CAP?	21
Reply Croatia	25
Q1: How can the different Green-Architecture elements optimally complement each other?	26
Q2: What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?	30
Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?	31
Q4: How can science contribute on indicators and the way they are used for performance evaluation of the CAP?	32
Reply Cyprus	35
Q1: How can the different Green-Architecture elements optimally complement each other? (What key factors and considerations should be made in ensuring the Green Architecture operates best?)	35

Q2:	What can be the role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?	41
Q3:	How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?	48
Q4:	How can science improve the way indicators are used for performance evaluation of the CAP?	51
Reply France		55
Q1:	How can the different Green-Architecture elements optimally complement each other?	55
Q2:	What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?	59
Q3:	How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?	63
Q4:	How can science contribute on indicators and the way they are used for performance evaluation of the CAP?	65
Reply Germany		67
Q1:	How can the different Green-Architecture elements optimally complement each other?	67
Q2:	What can be the role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?	76
Q3:	How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?	87
Q4:	How can science improve the way indicators are used for performance evaluation of the CAP?	90
Reply Ireland		93
Q1:	How can the different Green-Architecture elements optimally complement each other?	95
Q2:	What can be the role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?	102
Q3:	How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?	111
Q4:	What landscape- and biodiversity indicators could be used to strengthen the indicator-system of the CAP?	115

Reply Italy	119
Q1: How can the different Green-Architecture elements optimally complement each other?	119
Q2: What can be the role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?	122
Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?	124
Q4: How can science improve the way indicators are used for performance evaluation of the CAP?	125
Reply Poland	129
Q1: How can the different Green-Architecture elements optimally complement each other?	129
Q2: What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?	136
Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?	141
Q4: How can science contribute on indicators and the way they are used for performance evaluation of the CAP?)	145
Reply Slovakia	147
Q1: How can the different Green-Architecture elements optimally complement each other? (What key factors and considerations should be made in ensuring the Green Architecture operates best?)	147
Q2: What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?	152
Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?	155
Q4: How can science contribute on indicators and the way they are used for performance evaluation of the CAP?	159
Reply Slovenia	163
Q1: How can the different Green-Architecture elements optimally complement each other?	164
Q2: What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?	167

Q3:	How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?	170
Q4:	How can science contribute on indicators and the way they are used for performance evaluation of the CAP?	172
Reply Spain		175
Q1:	How can the different Green-Architecture elements optimally complement each other?	176
Q2:	What can be the role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?	184
Q3:	How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?	197
Q4:	How can science improve the way indicators are used for performance evaluation of the CAP?	200
Reply Sweden		207
Q1:	How can the different Green-Architecture elements optimally complement each other?	207
Q2:	What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?	210
Q3:	How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?	215
Q4:	How can science contribute on indicators and the way they are used for performance evaluation of the CAP?	218
Reply Austria*		221
Q1:	How can the different Green-Architecture elements optimally complement each other?	221
Q2:	What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?	224
Q3:	How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?	226
Q4:	How can science contribute on indicators and the way they are used for performance evaluation of the CAP?	227
ANNEX II: Opinions on the Flagship-Eco-schemes		229

Comments on the Eco-schemes Flagship Agroforestry	230
Comments on the Eco-schemes Flagship Agri-Ecology	232
Comments on the Eco-schemes Flagship Precision Farming	236
Comments on the Eco-schemes Flagship Carbon Farming	240
General comments on Eco-scheme Flagships	244
ANNEX III: BIBLIOGRAPHY/REFERENCES	248
References	249

ANNEX I: FULL COUNTRY REPORTS

Reply Bulgaria

Workshop facilitator: Yanka Kazakova (University of National and World Economy – UNWE, Economics of Natural Resources Department)

Participants: Irena Atanasova (Soil Institute "Pushkarov"), Borislava Borisova (National Agriculture Advisory Service), Yuliya Doichinova (UNWE, Economics of Natural Resources Department), Bozhura Fidanska (Institute of Agricultural Economics), Mihail Iliev (Bulgarian Society for the Protection of Birds), Yanka Kazakova (UNWE, Economics of Natural Resources Department), Diana Kopeva (UNWE, Economics of Natural Resources Department), Petya Kumanova (National Agriculture Advisory Service), Simeon Lukanov (Bulgarian Academy of Science, Biodiversity Department), Marina Nikolova (Economic Academy "Tzenov", Svishtov), Mariya Peneva (UNWE, Economics of Natural Resources Department), Vladislav Popov (Agriculture University, Plovdiv), Petya Slavova (Sofia University, Sociology Department), Vyara Stefanova (Society for Territorial and Environmental Prosperity), Vanya Todorova (National Agriculture Advisory Service), Rossen Tzonev (Sofia University, Ecology Department)

Workshop date: 10.11.2020

The texts in *italic* were discussed during the online workshop, all others were further elaborated and submitted in written format.

Q1: How can the different Green-Architecture elements optimally complement each other? (What key factors and considerations should be made in ensuring the Green Architecture operates best?)

a) In its design (e.g. how AECM or Eco-schemes should be designed/funds allocated/improved)?

EU level	Bulgaria
AECMs should aim at the preservation of GBI elements and connectivity features characteristic of specific agricultural regions, with Eco-schemes providing locally adapted measures for target species and/or habitats (i.e., incentives for maintaining existing GBI in complex landscapes and for creating new GBI in suitable simple landscapes).	Measures in Bulgaria should be aimed mainly at maintaining existing GBI and preventing field-size enlargement

More synergies between agriculture, food and city policies. At the moment, there no clear engagements of CAP for the city policies and food policies, as the engagement of the CAP for environmental objectives. The strategy, that I would rather call „From fork to farm"(and not the opposite for stimulating the informed behaviour of the consumers) is a very hesitant step in this direction. Therefore, I would suggest that line 6, page 310 of the Position paper, points 1-4, should be directly linked to the requirement in the Strategic Plans of the member states to prepare Food and Urban strategies , directly linked to the expected results from the agriculture and promotion of short supply chains as well as promotion of schemes that creating links between farms and urban communities (urban agriculture) An additional recommendation is to include the need to prepare municipal agricultural and forestry development plans. The municipalities, together with the state, are the only public owners of forests and arable lands. However, how these lands are governed and how their governance corresponds to the "green goals" is completely unclear not only in Bulgaria, but also in the Central and Eastern Europe.	
At least 10% of farmland on the farm level should be occupied by landscape features and elements of green and blue infrastructures, which are highly effective in ecologic terms for the specific region. These include: semi-natural elements such as grasslands including scrubland, trees, wetlands or floodplains; connectivity features such as buffer strips, field margins, hedges, ditches, etc.; but not in-field productive features such as nitrogen fixing crops, catch crops or green cover.	Environmental goals should be adapted to the characteristics of the regions, and their implementation should be on a regional level. In the regions with predominantly extensive farming the best strategy would be to keep the existing landscape elements; whereas in the regions with intensive farming targeted efforts for creation and restoration of the landscape elements are needed. The target level for cover with green and blue infrastructure at a regional level range between 10% and 20%.
Support for permanent grasslands under CAP Pillar I in accordance with their natural characteristics and consistent with the services they provide for protection of biodiversity (exceed the existing commitments according to the requirements of the Regulation). Permanent grassland is the only type of land use, which can simultaneously contribute to the protection of biodiversity and for the	Key needs for restoration, improvement and maintenance of biodiversity in agricultural lands in Bulgaria are: - Preservation and restoration of the area size and quality of High Nature Value farmland. - Preservation and restoration of landscape features in agricultural land with a view to achieving efficient and connected green infrastructure in rural areas.

reduction of the farm's carbon footprint, in line with the requirements of the EU Biodiversity Strategy 2030. The higher quality of permanent grasslands from environmental point of view needs to be adequately understood by the agricultural policymakers. A targeted Eco-scheme is needed in order to support the sustainable management of permanent grasslands. It is recommended that the support is stepwise and relevant to the environmental services: ✓ Basic payment level for permanent grasslands with landscape features and elements in them of up to 10%. ✓ Level 1 with bonus payment for permanent grasslands with landscape features and elements in them of 10,1%-15%. ✓ Level 2 with higher bonus payment for permanent grasslands with landscape features and elements in them of 15,1%-20%. ✓ Level 3 with highest bonus payment for permanent grasslands with landscape features and elements in them of 20,1%-25%.	- Preservation, restoration and increasing the conservation status of habitats and species in the agricultural land within the scope of the European ecological network Natura 2000. They should be reflected when designing Bulgarian Strategic plan
	Support for permanent grasslands of High Nature Value through the agri-environmental measure under CAP Pillar II (continuation of existing commitments in accordance with the requirements of the Regulation). Preserving the schemes "Restoration and maintenance of High Nature Value grasslands", "Traditional practices for seasonal grazing of animals (pastoralism)*" and "Conservation of endangered local breeds". <i>* (comment for clarification): The conditions and support under this sub-scheme needs to be re-assessed from the perspective of the conservation objectives of the national parks and should be maintained as a conservation measure with related monitoring and evaluation of results, not as agriculture support measure which is the case now.</i> Furthermore, considering the results of the assessment of change in scope of High Nature Value farmland of 2019 against 2007 (research not yet published , Y.Kazakova), it is mandatory

	MoAF to carry out a new assessment of their scope and quality in 2020 in order to ensure that the targeted agri-environmental schemes are aimed precisely at grasslands, not at areas with changed land use.
	Introduction of (pilot) schemes for result-based instead of activity-based agri-environmental payments (exceed the existing commitments according to the requirements of the Regulation). Bulgaria is one of the few Member States, which had not implemented result-based agri-environmental schemes, even at pilot level. It should be noted that this is an innovative approach for protection and improvement of biodiversity in agricultural land through the active involvement of farmers, which is recommended by the EU Biodiversity Strategy 2030. Result-based agri-environmental payments can be of particular benefit for improving the state of habitats and landscapes with a view to achieving favorable conservation status, as required in Natura 2000 sites. Their implementation in Natura 2000 sites would elaborate on the compensatory payments for the introduced restrictions in the use of agricultural land.
	Preservation of the mosaic landscape in the few remaining areas with high share of land with mixed land use by introducing a targeted agri-environmental scheme (exceed the existing commitments according to the requirements of the Regulation). The collective application of this scheme would be much more effective and beneficial in terms of preserving the mosaic landscape on a larger scale and should therefore be encouraged. There are various examples of collective application of agri-environmental schemes. They require the development of a joint plan for preservation and development of the mosaic landscape, which determines the commitments of each individual farm, the recommended types of land use and landscape elements. Since Bulgaria lacks experience in the implementation of collective agri-environmental schemes, it is recommended to test them at a pilot level in areas with high

	share of land with mixed land use and with typical/ traditional landscapes
--	--

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	Bulgaria
On a MS level, implementation should be based on assessment of the relationships between biodiversity and GBI elements, and measures should promote the most important elements for each country (i.e., promoted GBI elements should be MS-specific, and not common for all MS in the agricultural region).	AECM should be implemented in the Strategic Plan, with Eco-schemes complementing them on a lower level.
	Require MS to apply e-governance in a good governance way allowing better synergies between agricultural policy and environmental policy (integration of e-cadaster of arable land, pastures and HNV with Natura 2000 data and map).
	Adaptation of the national definition of permanent pastures and of their eligibility for support under CAP schemes and measures so as to reflect the regional characteristics of pastures and meadows in our country (exceed the existing commitments according to the requirements of the Regulation). The direct translation and adoption of the definition of permanent pastures set in the EU Regulation without using the given opportunity for its flexible adaptation in accordance with national and local characteristics, is causing significant loss of important fodder areas for stock breeders with grazing animals, as well as loss of habitats of conservation significance within the European ecological network Natura 2000. Possible approaches for adapting the definition and, accordingly, their eligibility for support are:

	A) based on their location and characteristics in mountainous or in plain areas; B) based on their classification in the Bulgarian Survey for Monitoring the Agricultural and Economic Conjuncture (BSMAEC) to permanent productive meadows, alpine pastures, low productivity grasslands and meadows-orchards. C) based on the habitat type in accordance with the Habitats Directive (Council Directive 92/43/EEC).
--	--

Specific questions:

Q1.1: What type of measures should each Green-Architecture instrument focus at from an environmental perspective?

Instrument	Should cover...
AECM	Result-based pro-environmental farming practices.
AECM	Biodiversity
AECM	• Result based AE schemes; Support for permanent grasslands of High Nature Value through the agri-environmental measure under CAP Pillar II • Preservation of the mosaic landscape in the few remaining areas with high share of land with mixed land use by introducing a targeted agri-environmental scheme, • Preservation and restoration of the area scope and quality of High Nature Value farmland, • Preservation and restoration of landscape features in agricultural land with a view to achieving efficient and connected green infrastructure in rural areas, • Preservation, restoration and increasing the conservation status of habitats and species in the agricultural land within the scope of the European ecological network Natura 2000.
Eco-schemes	Incentives for maintaining existing GBI and creating new beneficial GBI when needed.
Eco-schemes	Support for permanent grasslands under CAP Pillar I in accordance with their natural characteristics and consistent with the services they provide for protection of biodiversity (exceed the existing commitments according to the requirements of the Regulation). Permanent grassland is the only type of land use, which can simultaneously contribute to the protection of biodiversity and for the reduction of the farm's carbon footprint, in line with the requirements of the EU Biodiversity Strategy 2030.

	The higher quality of permanent grasslands from environmental point of view needs to be adequately understood by the agricultural policymakers. A targeted Eco-scheme is needed in order to support the sustainable management of permanent grasslands. It is recommended that the support is stepwise and relevant to the environmental services: - Basic payment level for permanent grasslands with landscape features and elements in them of up to 10%. - Level 1 with bonus payment for permanent grasslands with landscape features and elements in them of 10,1%-15%. - Level 2 with higher bonus payment for permanent grasslands with landscape features and elements in them of 15,1%-20%. - Level 3 with highest bonus payment for permanent grasslands with landscape features and elements in them of 20,1%-25%.
Enhanced Conditionality	Compulsory tools aimed at the preservation of existing GBI, in combination with Eco-schemes.

Q1.2: Which conflicts between instruments, that you are aware of, can be resolved in the new Green Architecture and how? (at EU level or in your country)

Problem	Solution
<i>The implementation of the Agri-environmental measure for seasonal grazing (Pastoralism) in the National parks where all economic activities are not allowed</i>	<i>This measure should not be applied in the National parks and protected areas above with altitude above 1000 m a.s.l. The grazing there should be done only by wild fauna. Otherwise this are false initiatives for conservation of the ecosystems</i>
<i>If grazing is an activity that is supported in the Management plans of the National Parks, it will be very difficult to exclude it from the RDP Agri-environmental measure</i>	
<i>A big problem typical for Bulgaria is the change (conversion) of the permanent land use. It is not controlled by the Ministry of Environment even in Natura 2000 sites. The problem originates in the fact that during the transition period (1989 -2007) a lot of arable lands have been abandoned and became grasslands. However, according to the land titles, the permanent land use of these areas is 'arable land', so the farmers have the right to</i>	<i>A solution could be an introduction of a reference year for the grasslands in Bulgaria. I propose 2007 as a reference year for the habitats, protected by the Habitat Directive. 2007 is the year when Bulgaria joined the EU and designated Natura 2000 sites.</i>

<i>plough it and transform the grasslands to arable land.</i>	
<i>The so called 'Cleaning of the grasslands' – for example the cleaning with shredder machines. The problem originates in the fact that in order to be eligible for SAPS support the grasslands that are not grazed or mowed are eligible for SAPS if the grass is not higher than 35 cm. So owners/farmers are 'cleaning' them once during the year, but are not gathering the cut grass, which leads to nitrification (pollution)</i>	<i>One way to solve the problem is to develop management plans for Natura 2000 sites * and further on implement these plans through Natura 2000 RDP measure. The Management plans can define where the bushes have to be cleaned, and where they have to be preserved. * comment for clarification: Natura 2000 management plans are long overdue in Bulgaria and a cause for a serious concern in nature conservation.</i>
So far CAP policy undermines the objectives of the EU's biodiversity policy by failing to tackle biodiversity crisis.	While the "Space for Nature Instrument" and the "Nature and Biodiversity Instrument" have separate aims, there is the possibility for the latter to complement the former by adding additional management requirements, and also better results, to the same area in return for higher levels of public support.
Again a large percentage of the budget is dedicated to the direct payments in the new programming period -> a large part of the agricultural lands will continue to be managed intensively and the negative tendencies in relation to the environment and biodiversity will continue .	Smaller budget for Pillar 1 (like in Guy's article) and larger budget for Pillar 2.
The benefits to the landowners and loss of biodiversity	• To introduce more locally targeted payment schemes which will be more adapted to the local biodiversity features. • To avoid large and unified payment schemes for bigger regions
Reducing the ploughing of the pastures and meadows and their maintenance in good condition for conservation of biodiversity and habitats cannot happen if the integrated map of protected areas and Natura 2000 sites is not included in the Lands Cadastre. Currently the land in Natura 2000 sites can be plough because in the Land Cadastre it is included as arable land, in spite of the fact that due to the landscape changes this land was included in Natura 2000 network. That way the large percentage of designated Natura 2000 sites in Bulgaria, becomes much smaller in practice.	

The second reason for that is the deliberate ploughing of the pastures by farmers, stimulated by the vicious direct area payments, but there is also unintentional ploughing, when the agricultural producers cannot determine the coordinates of the plots.	
Climate change. The proposed measures are directed towards climate change mitigation and adaptation, but some of them have already taken place, but they are not integrated in the CAP implementation policies, thus creating greater risks for the environment. Example: The mowing of Natura 2000 pastures is prohibited until 15 June. The largest site in the Natura 2000 network is Strandja-Sakar site, which in the last 10 years is characterized by a steady increase of the temperatures during summer season, which leads to earlier drought. The statistics show that the lawsuits filed against the farmers for causing a fire as a result of the maintenance of pastures (classified as unintentional fires) has increased significantly. If the ordinary statistics of fires are checked, it becomes evident there is a significant increase of the fires in this area without knowing the cause and the specific areas in which they occur. Fires are causing much more damage than the introduction of an earlier date for mowing or grazing of the grasslands.	In this case integrating climate change into policies already seems like a reasonable recommendation to me. It can be included in the proposed measures such as: Improving farmers' requirements for pasture maintenance periods, methods and mechanisms so that climate change has already been addressed and prevented in the future

Q1.3: What should be quality criteria for the EU Commission to evaluate ambition in the Member States' [your country's] Strategic Plans? (e.g. minimum requirements from MSs to ensure success of the Green Architecture as a whole)

Criteria should be based on data quality – i.e., the Strategic Plan should rely on quality research data as much as possible (as opposed to expert assessment based on extrapolation), demonstrating the current status of the target species and habitats (i.e., the reasons they were chosen) and estimating how the proposed measures would benefit them (e.g., promoting grasslands has been demonstrated to benefit threatened bird species). “Ambition” in this regard should be evaluated as the extent to which the proposed measures would benefit rare and threatened species, as well as overall species richness, based on available scientific data
The minimum requirements must be as high as possible which means that the Strategic plans for all Member States should be similar to a large extent . Of course, it is good for some countries to have ambitious plans, but that does not guarantee that other countries will have the same high goals. It is perfectly understandable in Western Europe to be more ambitious to achieve real results for biodiversity, however the key elements of biodiversity, including the land supported by CAP, are higher in South and Eastern Europe. The Member States in Eastern and Southern Europe (and Bulgaria in particular) are unlikely to have such high ambitions. The introduction of very low minimum requirements will lead to the development of weak Strategic plans, which in theory will

be implemented, but in practice will not lead to significant changes for conservation of the elements of the environment.

The environmental and nature assessments in the SWOT of the Strategic plans have to outline the main S/W at national level as well as at regional level. It is not realistic to expect that the nature characteristics, S&W are the same in the intensive lowlands and the semi-extensive mountains or the hilly regions. Thus the issues and solutions would differ between these types of regions.

Environmental assessments have to be relevant to the agricultural sector and specific to production practices, and not generic in formulation and potential solutions. Eg. „Birds populations decreased in the last 10 years“. How much? Which bird populations – common, farmland, forest? In which regions of the country? Dependent on which production systems? Anything less detailed is not useful for the strategic planning process and is just box-checking exercise.

The ambition has to be measured against (1) each environmental component and (2) the level of achievement of the „ambition“ from the previous/current RDPs. If RDP 2014-2020 aimed at achieving X% of habitats with improved conservation status, the assessment has to ask was it achieved, to what extent, what were the reasons for not achieving it, what ACTUAL/REAL steps were taken to reduce/address the problems of the underachievement of the current RDP and only then to measure the ambition of the new SP. The new SP should exclude environmental components/priorities of the previous RDP only if they are no longer a problem, or when they prove that there is another, equal in funding and ambition instrument, that would address them.

The ambition has to be measured from several aspects:

- 1) **Breadth of the actions** to address the problem, i.e. improve the conservation status of agriculture dependent habitats. How many habitats in BG are dependent on agriculture, what is their current status, what are the necessary actions to improve the status of each habitat type, how many of them (habitats and related actions) are included in the Strategic plan?
- 2) **Ambition of the budget** – is the allocated budget sufficient to fund actions to improve the conservation status of how many habitats? Or what % of the habitats?
- 3) **Planned advisory and technical support to farmers and land managers** to guide them for the best possible actions and timeframe to carry out the activities on their farms in their regions, so that there is a real effect.
- 4) **Planned monitoring and evaluation of the actions/measures/schemes** on the conservation status of the target habitats. Currently, the Natura 2000 compensatory payment measure is considered the most ambitious and effective nature conservation measure as it supports over 10.000 farmers with over 25 mln Euro each year, however, it has absolutely no monitoring so the nature conservation effect is practically unknown (Kazakova, 2020). Thus, since 2011, when it was first implemented, approximately 250 mln euro are invested in something with unknown effect.
- 5) **Planned procedure for adapting the measure/scheme** if it turns out that the proposed actions need to be adapted to reach the nature objectives better.

Q1.4: Under which conditions could other CAP-instruments be considered as contributing to the Green Architecture? (e.g. Areas of Nature Constraints, investments, AKIS/consultancy, sectoral payments or DP (coupled/non-coupled) etc.)?

Areas of Nature Constraints

Introduction of trainings targeted at farmers managing agricultural land in Natura 2000 sites, as well as targeted consultations and advice on environmentally friendly farming practices for protection and restoration of species and habitats in particular protected areas (exceed the existing commitments according to the requirements of the Regulation).

This addresses the needs for clarification of the essential requirements for management of agricultural land in Natura 2000 sites, including for justification of the reasons for the imposed prohibitions of use of agricultural land; what benefits are expected and desired for biodiversity, as well as what benefits the protection of biodiversity would bring for the farming activities and lands; which species and habitats are subject to protection in the respective territories; what are the indications for favorable condition of the species and habitats in agricultural land, etc.

Q2: What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?

It is unlikely that in the short term (lasting 1 year) and with voluntary implementation the Eco-schemes will have a significant role in achieving the objectives of the CAP. The very principle of measuring the performance of this instrument within a year will set very low requirements and levels of indicators to be achieved. In practice, this is unlikely to have the desired positive effect on nature.	I believe that in order to achieve a visible impact on biodiversity conservation, the Eco-schemes must be applied over as large an area as possible (to be set as a requirement), at the expense of the short duration.
I think the best for conservation of biodiversity in agricultural lands will be compensatory payment for lost profits	It will be implemented with documents for management of Natura 2000 sites – management plans, designation acts, etc.
My personal opinion is that the lack of clarity for the programming of the instrument and the pressure which MS would feel to finalise the Strategic plans, and the Green Architecture in particular would undermine significantly any potential positive effect it may have. Additionally, the voluntary character of the scheme would bring out again the least effort-requiring and least environmentally effective schemes.	The potential or possible the only sensible solution would be to start the implementation without the Eco-schemes. Give detailed guidance about the quality requirements of the Green Architecture planning and 2-3 years to do it. Then require MS to present a thorough, detailed and scientifically justified planning and assessment of the specific nature needs of each production system and region. If we are serious in our “ambition for the Green Architecture” as the new and successful tool in CAP – it should not be hurried up; thus, I would consider the 2021-2023 period as a preparatory period to step it up after that.

What key factors and considerations should be made in ensuring the Eco-schemes are attractive (for MSs and farmers), effective, cost-efficient (in relation to the spent budget) and synergistic with AECM and other instruments? *(Please remember that measures should fit to an annual scheme and applying for an Eco-scheme is voluntary for farmers)*

a) In its design (e.g. how AECM or Eco-schemes should be designed/improved):

EU level	Bulgaria
AECM and Eco-schemes should be designed to be as close to traditional agricultural practices (the most commonly used practices in a given region) as possible.	
I cannot comment on the design of Eco-schemes, as I generally doubt that they will be an effective tool, given their voluntary nature.	Due to the voluntary nature, the schemes must be financially attractive, but there must be real checks on whether the measures under the schemes are implemented.
The results of the BIOGEA project were clear that flexibility at EU level is good as it allows adaptations at national level. But if the justification and implementation requirements for MS at the programming stage are not sufficiently high there is no way to compensate the lost ambition during the actual implementation.	-Have to be adapted to the local /regional characteristics -Have to be ambitious but still doable by farmers, if too many changes are needed at once – the voluntary character of the scheme would destroy it -The technical aspects of the implementation – e.g. the delignation of the features / elements / plots in LPIS have to well known by the farmers and the technicians in the local/regional agriculture offices where the applications are submitted -The controls and sanctions have to known in advance. Farmers do not like to take risk on their CAP payments and avoid actions that may threaten them. BIOGEA project found that the lack of clarity on controls and sanctions in the first years of the Greening scheme demotivated them from taking up more ambitious options.

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	Your Member State (/region)
	Eco-schemes should promote woody and grassy strips, fallow land, tree groups and grassland, as these elements have been demonstrated to have a positive effect on local species diversity.
There should be a clear differentiation of the commitments that are going to be taken within the agri-environmental payments and the ones within the Eco-schemes, so that there is no double funding for the same activities. On the basis of scientific evidence on agricultural payments to make a scale of the most effective measures on the principle: effect on biodiversity <-> cost of implementation, in order to direct the efforts and the resources towards the most effective measures.	
EC should insist stronger on the lack of implementation of planned measures and schemes. The case in BG is that very often the RDP is well balanced and ambitious when programmed but very disbalanced when implemented. This happens because the Paying Agency favours the measures that are “easy-spent” and does not open regular call for proposals for the rest of the measures (eg. the measure for Innovation partnerships was only opened in the last trimester of 2019), or alternatively does not promote the area-based schemes that are not favoured. As a result the budget of the “disliked” measures is redistributed to the favourites and thus, utilised by a handful of measures for 3rd programming period (since 2000). So, the EC has to be stricter when agreeing to the redistribution of budgets of environmental or innovation-focused measures, and to accept only well motivated and justified explanations assessing the effects of the problems that would remain unaddressed.	MS should implement all programmed measures and schemes within the programmed budget and scope. MS should ensure that farmers have advisory support and consultants that can help them implement the measures & schemes in the way they were programmed and to achieve the programmed objectives. MS should carry out regular monitoring of nature conservation effects of each programmed measure & scheme.

Specific questions:**Q2.1: What are the pros and cons of a closed list-based approach (menu of options)?**

Pros	Cons
	<i>Again there is limit to choose from a menu offered, without considering whether this is the most adequate option for the farm/region/Bulgaria.</i>
Easier for both applicants and administrators. Provides a clear and concise list of elements that are known to benefit biodiversity. Overall effects can be more easily measured and evaluated.	If done incorrectly (i.e., options are too general, or are based on insufficient data, etc.), this approach would not fulfil its task. Does not allow targeting/adaptations for specific regions
It makes the rules more clear and equal for all member states.	However, they are not adapted to the social, economic and legislation specifics of member states.

Q2.2: If the EU and MSs choose on a menu option, what would you list as examples that should or should not be included? (Please remember that measures should fit to an annual scheme and applying to an Eco-scheme is voluntary for farmers)

a) Examples of concrete, potentially-effective/cost-efficient Eco-scheme options that should be included:

At EU level	In your MS / region	Why?
	<i>We have to the four examples published by the Commission on 9/10/2020 with our country priorities and what will be the best for country. For example: Minimum till, No, etc. How to decrease the use of the option „fallow land” and to increase the use of the option “Nitrogen fixing crops”. What to include in the Eco-scheme to achieve double effect: decrease of the use of the mineral fertilizers and increase of the soil diversity.</i>	
	<i>All measures for arable lands should include the requirement for protection/inclusion of landscape characteristics.</i>	

	<i>There should be a very precise definition of a “landscape characteristic” and what needs to be restored/ maintained.</i>	
	<i>We think that the Instrument for nutrient management is a very useful tool</i>	
	<i>The supported measures and schemes should be implemented on a landscape level by group of farmers. (Collective approach to achieve results on a landscape level)</i>	
	<i>I think that the Agri-environmental options and the support for Organic farmers should be included as Eco-schemes</i> <i>The problem that we have observed is the wrong advices that are given to farmers (to choose the schemes, because the subsidies are high and the requirements are low).</i>	
	Promote the preservation of woody and grassy strips, fallow land, tree groups and grassland.	These elements have been demonstrated to have a positive effect on local species diversity (e.g., Concepcion et al 2020).
Available options at EU level should be divided into agricultural regions based on available scientific data.		The same GBI elements have vastly different importance for biodiversity preservation in different countries and regions.
	Compensatory payments for NATURA 2000	Many ecological requirements of species and NATURA 2000 habitats are reasons for lost profit of farmers.
	Prohibition of changing the way of permanent use of grasslands	Great number of grasslands in Bulgaria have been destroyed because of ploughing for subsidies of agricultural lands

A targeted Eco-scheme is needed in order to support the sustainable management of permanent grasslands. It is recommended that the support is stepwise and relevant to the environmental services: ✓ Basic payment level for permanent grasslands with landscape features and elements in them of up to 10%. ✓ Level 1 with bonus payment for permanent grasslands with landscape features and elements in them of 10,1%-15%. ✓ Level 2 with higher bonus payment for permanent grasslands with landscape features and elements in them of 15,1%-20%. - Level 3 with highest bonus payment for permanent grasslands with landscape features and elements in them of 20,1%-25%.	
--	--

b) Examples of concrete, ineffective or problematic or cost-inefficient options that should not be included:

At EU level	In your MS / region	Why?
	<i>AE Pastoralism measure (see Q1.2.)</i>	
	<i>All proposed schemes are good, but the problem is how they are implemented. For example no difference is made between “crops rotation” and “crops diversification”. Another important issue when applying the schemes and the measures is to upgrade with higher requirements and not to supplement the schemes.</i>	
All options are available to all MS.		This could potentially lead to MS choosing options that are the easiest to implement, but not the most beneficial.
	Promote creation of new GBI elements in extensive or complex systems.	It has been demonstrated that the benefit of newly created GBI is inversely proportional to landscape complexity.

	Support of conservation grazing in protected areas and especially in the national parks.	It is causing loss of biodiversity and also it is in contradiction of their functions and designation. The most important is the conservation of wildlife biodiversity.
	Clearing of shrubs and trees in the pastures.	It is causing great loss of biodiversity.
The labelling of agriculture productive land uses as green elements and allowing the implementation of the Greening commitment only by such options – nitrogen-fixing, green cover, etc. The inclusion of precision farming as potential Eco-scheme which receives annual area-based payments		Precision farming should benefit for investment support if such is needed but not from area-based support. It will absorb huge shares of the budgets with minimal environmental benefits.

Q2.3: What are the pros and cons of a top-up payment versus income foregone? What would you recommend and why?

Pros	Cons
In some cases it is the best way for conservation of biodiversity in the agricultural lands.	Without good knowledge of the species and habitats in any agricultural plot can become a waste of funds.
Top-up payments: Easy to calculate and disburse, reduces transaction costs and efforts for the administration, not for the farmers Income forgone:	Top-up payments: Top-up payment does not reflect the actual costs and benefits of the action Top-up payment on basic payment creates an image of the Eco-scheme as something external and attached to what the farmers are entitled to receive as their right, so may inhibit negative associations just as Greening did. Income forgone:

Provides a compensation for the costs, but should also compensate for the effort and allow for a stimulus component in it.	More difficult to calculate the payments for the administration, especially if the schemes are also regionalised.
--	---

Q2.4: How should Eco-schemes best be organized spatially, among themselves and with respect to AECM? Please consider: How can this be promoted by the EU and administrated by MSs? How to balance cost-efficiency of the measure (focus on hot spot) vs. Broad scale application?

Perhaps a division based on land use type could be beneficial – e.g., AECM focused on extensive pastures/intensive arable land/mixed farming systems, etc., with complementing Eco-schemes focused on local specifics.
To make them definitely directed to the biodiversity conservation, there must be maximal involvement in their design of experts of species and habitat
All discussions we had in the framework of HNV-LINK and BIOGEA projects in Bulgaria in the last 5 years, underlined the need for regionally-specific adaptations and modifications of the schemes developed at national level. The regional in most cases related to lowlands vs. mountains. However, we consider that N2K focus could also help having in mind that most of the agriculture-dependant/influenced habitats are not in favourable conservation status.

Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?

S.M.A.R.T.: “Specific, Measurable, Ambitious/attainable, Realistic, Time bound”

Note: The Biodiversity strategy requires a) 10% landscape features, b) expansion of organic farming to 25% UAA and c) reduction in pesticide (impacts) by 50%.

What key factors and considerations should be made by MSs when setting targets in their CAP strategic plans, and how should the EU guide and assess them?

EU level	Bulgaria
A clear distinction should be made between extensive and intensive land uses, with each group having its specific targets. Assessment should be divided accordingly, as meeting targets for extensive land use types could maintain, rather than increase, species diversity – which does not make this less important.	Bulgaria will mostly benefit from maintenance of existing GBI elements, so focus should be on this aspect, combined with reduction of pesticides.
	Development of a system for monitoring and evaluation of the effects of CAP support on biodiversity in agricultural land, both in Natura 2000 sites and outside them (exceed the existing commitments according to the requirements of the Regulation). This system should integrate the requirements and needs for monitoring and evaluation of CAP schemes and measures, but also for Natura 2000 reporting in agricultural land.

Specific questions:

Q3.1: What should count as “ambitious” targets? (how do you measure ambition?)

Ambition should be measured in terms of increased number of both plant and animal species as a direct result of reaching the set targets (unless the aim is preservation and maintenance of already high species diversity).

Q3.2: How should baselines be defined? (e.g. in terms of year, UAA/habitat cover etc.)

Baselines should be defined in accordance with available scientific data on the thresholds beyond which the proposed measures would not be effective, as effectiveness is limited by landscape context (e.g., Concepción et al., 2012, 2008; Tschardt et al., 2012, 2005).

Q3.3: What should the EU demand from your MS to clarify in its targets?

Necessity: justify the need for the specific target (e.g., extensive pastures and associated species are in decline, in need of better maintenance).

Methodology: clearly presented methods by which the target could be reached, based on available scientific data.

Results: what are the expected results and how they contribute to meeting the stipulated aims.

Q4: How can science contribute on indicators and the way they are used for performance evaluation of the CAP?

Note that the CAP comprises Output, Result and Impact indicators and in the next period also Complementary Result Indicators (CRI). Annexes are closed but a) methods can be improved and b) the CRI requires indicators for biodiversity.

Specific questions:

Q4.1 How can landscape features be best mapped? (Impact indicator to be used in the next CAP. Needs to be up to date, detailed)? It is feasible in your country?

Indicator	Justification	For which MSs?
% trees and shrubs in the pastures. There are two options for mapping – ortho-photo photos or field visits.	There are articles and manuals in Bulgaria on that subject (see the list at the end)	
% strips / field boundaries and uncultivated areas in the agricultural land.		
Landscape features	No legislation for this indicator. For example, there is not Act for Landscape conservation	Bulgaria
Landscape diversity on some level (property, physical blocks)	At this moment not applicable – there is no evaluation system, not classification, must be developed in the future	Bulgaria

Q4.2 How can the methods for biodiversity indicators be improved, for the habitats and species of the Habitats Directive? (Impact indicator to be used in the next CAP). It is feasible in your country?

Indicator	Justification	For which MSs?
Species diversity and abundance – a lot of indicators for all relevant habitat and animal groups	The indicators give a real idea of whether the implemented strategies are effective or not	All
Standard indicators for all MS		
Natura 2000 land indicator – status of the species subject to protection in the specific area.		
FCS of habitat and species in agricultural lands	No actual monitoring and assessment of the conservation status of habitat and species	Bulgaria
Endangered and critically endangered species and habitats from Red Data Book	It is more applicable because their assessment already was done. Comparing to species of Habitat Directive, there are not widespread on national level types and species.	Bulgaria

Q4.3 What are the best biodiversity indicators that can be proposed for the Complementary Result Indicator (FA 4A)?

“Restoring, preserving and enhancing biodiversity, including in NATURA 2000 areas, and in areas facing natural or other specific constraints, and high nature value farming, as well as the state of European landscapes”. See also here:

https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/complementary-result-indicators-pillar-ii_en.pdf

Note: such indicators should be feasible to collect and analyse in multiple MSs, they have a running monitoring system and available data, and can clearly interlink CAP interventions with observable biodiversity impacts. Indicators exist on different levels: farm-level, regional-level and memberstate-level)

Indicator (please note the kind of indicator and at which level your indicator is used)	Justification	For all MSs?
Monitoring of common bird species.	Provides scientific evidence for the condition of widespread bird species, some of which inhabit agricultural lands. There are a number of articles on that subject (see reference list at the end)	All At the moment in Bulgaria the monitoring is done on a voluntary basis, without secured funding from the relevant ministry, which makes it difficult to implement it on a larger scale. The sites are selected randomly, without prior information on whether there are agricultural measures and what they are focused on.
State of biodiversity (in particular birds) in areas with implementation of Biodiversity Eco-schemes and in those without such schemes.	It will show whether this new tool is effective or not.	At least as a pilot in Western European countries, it is fully applicable.
Conservation status of species and habitats in the agricultural lands	It is the best indicator if there is a good monitoring system in the country. Bulgaria has not such monitoring system.	Bulgaria
Populations of endangered and critically endangered species at national level	It could be done if the localities and population are very well known.	Bulgaria

Use the indicator High Nature Value farmland as complementary indicator	MS already have developed experience in reporting that indicator, so after its removal from the list of the result indicators, it can be used as a complementary indicator	All MS
---	--	--------

Reply Croatia

Workshop facilitator: Sonja Karoglan Todorović

Participants: Hrvoje Kutnjak (Ph.D. Faculty of Agronomy, Zagreb), Zrinka Mesić (Ph.D. Oikon Ltd. – Institute of Applied Ecology), Krešimir Mikulić (Ph.D. independent researcher), Martina Šašić, (Ph.D. Croatian Natural History Museum), Sonja Karoglan Todorović (M.Sc. Environmental Institute ECOLOGICA (workshop organizer)), Darko Znaor (Ph.D. Environmental Institute ECOLOGICA)

Workshop date: 03.11.2020

Introduction

1. Croatia has limited experience in programming various CAP instruments in an integrated way. Being the youngest Member State, Croatia designed and implemented its first CAP compatible instruments and measures (including greening and agri-environment) in the period 2014-2020.
2. Croatia is in the early stage of drafting national CAP Strategic Plan. So far, Croatian Ministry of Agriculture has not publicly disseminated any info about the preparation of it. Any information available is only through informal channels. There is no participatory process or public debate, especially not involving scientific and NGO community. It is expected that consultation with stakeholders on the Croatian CSP will be formal and on a short notice.
3. It is unclear how the three instruments of Green Architecture (GA) will work together in Croatia, and it will not be an easy task for authorities to design them, given their limited developing planning and implementation capacities and limited experience of previous programming period.
4. For most farmers in Croatia, requirements and in particular the interrelation of Green Architecture elements might be too complicated and not easy to grasp. The general sentiments of farmers towards CAP “greening” elements and requirements are negative and seen as something that complicates and jeopardizes their production and income.
5. Very few scientists in Croatia are experts in “greening” aspects of CAP. Knowledge gathered through couple of research and monitoring projects is scarce and not sufficient for the demanding task of designing of CAP GA elements.
6. Accordingly, the report below focuses on questions 1, 3 and 4.

Q1: How can the different Green-Architecture elements optimally complement each other?

(What key factors and considerations should be made in ensuring the Green Architecture operates best?)

a) In its design (e.g. how AECM or Eco-schemes should be designed/funds allocated/improved)?

EU level	Your Member State (/region)
Not all MS have the same level of ambition regarding the nature protection. Therefore, the EU Commission should not leave all the decisions regarding Green Architecture to MSs. To achieve a common level playing field across the EU, conditionalities should contain a set of similar rules for all MSs. More guidance is needed from the EC on measures it thinks might best be suited to Eco-schemes. Minimum percentage of direct payments should be ring-fenced for the ESs. ES should not be too ambitious – must be realistic and less ambitious than AECM. Otherwise, there will be no uptake of AECM. It will be challenging to measure the effectiveness of ES if they will have vague objectives and will be applied only as annual schemes. The ES should be designed as rather entry-level type of measures (light green), to leave a room for specific and targeted AECM that go beyond the level of ambition in Pillar I. Payments for ES and AECM must be designed proportionately. If payments for ES are based on opportunity costs and contain income element, then the same should be applied in AECM to avoid lower uptake in AECM induced by Eco-schemes. If payments for ES are designed with a large income component, farmers may decline to participate in AECM. Overall, high incentives in ES can lead to lower uptake in AECM. Measures without clear environmental conditions (e.g. animal welfare, precision farming, payments for areas with natural constraints)	In Croatia, 50% of direct payments goes to 3,5% of biggest farms/land managers. It is important to design ES in a way to make them attractive to them. Their participation is also important because their uptake can bring landscape-level benefits. They have big plots and heterogenous areas poor in biodiversity. In most intensive regions, lack of landscape features is the main problem. In non-intensive regions – land abandonment is the mayor problem, it is questionable if GA elements can, at least partly, be designed in the way to stop or reverse this process. ES should be simple because of our socio-economic reality, with lot of old and less educated farmers. ES could be interesting for farmers that have short term, sometimes even annual land lease contracts. These farmers are not eligible to participate in AECM (they need to have land lease contracts for at least 5 years). Results from monitoring and evaluation of the RDP 2014-2020 (in particular AECM) should be made available to scientific community and lessons learnt from them used in designing of CAP GA. Biodiversity experts should be consulted and involved in designing of CAP SP. In general: improve the flow of information, make it more participatory.

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	Your Member State (/region)
Ease application and administration Improve AKIS for CAP Green Architecture elements. Improve knowledge of farm advisors, engage more biodiversity experts.	Ease application and administration Strict controls and penalties for non-compliance discourage farmers which have limited experience with "green" measures. More advice and warnings, especially at the beginning of implementation of new measures, are needed. Many AECM beneficiaries do not follow the rules because the requirements are not well defined, or beneficiaries do not understand them. The most valuable grassland (e.g., karst grassland) have an exceptionally low eligibility coefficients and that discourage farmers to participate in AECM. Similar problem could occur with ES.

Specific questions:

Q1.1: What type of measures should each Green-Architecture instrument focus at from an environmental perspective?

Instrument	Should cover...
AECM	Specific and targeted AECM are crucial in addressing the specific environmental challenges. Result-based measures, in particular for karst grassland and flower rich meadows and certain species should be introduced, starting with pilot measures. Present experiences from monitoring AECM in Croatia support this approach. More innovative approach is needed (e.g. collective implementation and results-based measures).
Eco-schemes	Crop diversification Compensation for specific area-related legal restriction (e.g. Natura 2000 area, water framework directive areas) Fallow and flower strips on arable land might provide a positive environmental impact in the first year, but their impact increases the longer they remain on the spot. Whole farm nutrients management plan Support to existing management that are environmentally beneficial but threatened from abandonment (e.g. HNV grassland)

Enhanced Conditionality	Ban on converting or ploughing permanent grassland. Farm Sustainability Tool for Nutrients Crop rotation
--------------------------------	--

Q1.2: Which conflicts between instruments, that you are aware of, can be resolved in the new Green Architecture and how? (at EU level or in your country)

Problem	Solution
The procedure related to the approval of the Strategic plan is practically the only mechanism in the EC's power for ensuring targeted and ambitious strategic planning. Therefore, it is important that the Commission be empowered to conduct a proper qualitative assessment of the Strategic plans. CAP strategic plans should contain a satisfactory and balanced level of consultation between stakeholders and involvement of other public authorities, and the Commission should be well equipped to assess the plan within a reasonable timeframe. The role of data, indicators, knowledge and analyses for more effective strategic planning and therefore a better agricultural policy. The European Commission and Member states need to be obligated to provide reputable and independent scientific and technical evidence to support their choices.	

Q1.4: Under which conditions could other CAP-instruments be considered as contributing to the Green Architecture? (e.g. Areas of Nature Constraints, investments, AKIS/consultancy, sectoral payments or DP (coupled/non-coupled) etc.)?

Non-productive investments-if used for restoration of habitats, purchase of electric fences and sheep dogs in areas of large carnivores, restoration of stonewalls, terraces, planting hedges.
AKIS/consultancy – More and better advice is needed, but most advisors do not have sufficient knowledge on ES and AECM. Robust education and training programmes are needed to train advisors and farmers. Information campaigns highlighting role of farmers in protecting biodiversity and providing vital ecosystem services is needed.

Q2: What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?

What key factors and considerations should be made in ensuring the Eco-schemes are attractive (for MSs and farmers), effective, cost-efficient (in relation to the spent budget) and synergistic with AEEM and other instruments? *(Please remember that measures should fit to an annual scheme and applying for an Eco-scheme is voluntary for farmers)*

a) In its design (e.g. how AEEM or Eco-schemes should be designed/improved):

The application of ES for organic farming systems may present problems because ES are annual measures, whereas the conversion to organic farming is a long-term process.

Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?

S.M.A.R.T.: “Specific, Measurable, Ambitious/attainable, Realistic, Time bound”

Note: The Biodiversity strategy requires a) 10% landscape features, b) expansion of organic farming to 25% UAA and c) reduction in pesticide (impacts) by 50%.

What key factors and considerations should be made by MSs when setting targets in their CAP strategic plans, and how should the EU guide and assess them?

EU level	Your Member State (/region)
	Percentage of landscape features should be defined per regions. In some regions where intensive arable farming prevails, 10% percent of landscape features should be required. In other areas with extensive agriculture and natural grassland, there is still a lot of landscape features and percentage could be higher.

Specific questions:

Q3.2: How should baselines be defined? (e.g. in terms of year, UAA/habitat cover etc.)

Using orto-photo from year 2018. Define km of stonewalls and hedges.
Amorfa and other invasive species should not count in the baseline.

Q3.3: What should the EU demand from your MS to clarify in its targets?

Soya is eligible as EFA crop and area under soya doubled since 2015. Croatia should explain what soya's contribution to biodiversity is and why soya should be used instead of other legumes.
Ask Croatia about the number of farms and area involved in parallel organic production.
In the previous programming period Croatia used unrealistic and non-ambitious indicators.

Q4: How can science contribute on indicators and the way they are used for performance evaluation of the CAP?

Note that the CAP comprises Output, Result and Impact indicators and in the next period also Complementary Result Indicators (CRI). Annexes are closed but a) methods can be improved and b) the CRI requires indicators for biodiversity.

Specific questions:

Q4.1 How can landscape features be best mapped? (Impact indicator to be used in the next CAP. Needs to be up to date, detailed)? It is feasible in your country?

Indicator	Justification	For which MSs?
Biodiversity monitoring – difficult to organise, expensive, difficult to interpret – results/impact are not clear (e.g. if you have water pollution with N is easier to make a direct correlation). It is also not clear which factor/management action contributed to the success. Monitoring should be focused on landscape level rather than at plot level which takes part in AEEM.		

Q4.2 How can the methods for biodiversity indicators be improved, for the habitats and species of the Habitats Directive? (Impact indicator to be used in the next CAP). It is feasible in your country?

Indicator	Justification	For which MSs?
Currently for many habitats and species status is unknown, and the status is based on expert opinion, rather than on data.		

Q4.3 What are the best biodiversity indicators that can be proposed for the Complementary Result Indicator (FA 4A)?

“Restoring, preserving and enhancing biodiversity, including in NATURA 2000 areas, and in areas facing natural or other specific constraints, and high nature value farming, as well as the state of European landscapes”. See also here: https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/complementary-result-indicators-pillar-ii_en.pdf

Note: such indicators should be feasible to collect and analyse in multiple MSs, they have a running monitoring system and available data, and can clearly interlink CAP interventions with observable biodiversity impacts. Indicators exist on different levels: farm-level, regional-level and member state-level)

Indicator (please note the kind of indicator and at which level your indicator is used)	Justification
Number of farms and area involved in parallel organic production. FBI at the level of country is misleading. CRI should be developed for non-intensive and intensive farms. Because those non-intensive farms in karst region improve the country average. Based on new Agricultural Census one can extrapolate regions at Nuts 3 or Nuts 4 level or per municipality which are extensive/HNV and intensive. Use share of HNMF areas as complementary indicator.	
Our karst region is exceptionally biodiversity rich. Special indicators for karst region should be developed. Limit grazing pressure, in some areas is very intensive – especially in “forest land”, which is former grassland	

Reply Cyprus

Workshop facilitator: Menelaos Stavrinides (Cyprus University of Technology, Department of Agricultural Sciences, Biotechnology and Food Science, Limassol)

Participants: Adriana Brugemman (Energy, Environment and Water Research Center (EEWRC)), Constantinos Kounnamas (Nature Conservation Unit, Frederick University), Vassilis Litskas (Cyprus University of Technology, Department of Agricultural Sciences, Biotechnology and Food Science; Faculty of Pure and Applied Sciences, Open University of Cyprus), Menelaos Stavrinides, Ioannis Vogiatzakis (Faculty of Pure and Applied Sciences, Open University of Cyprus)

Workshop date: 26.11.2020

Q1: How can the different Green-Architecture elements optimally complement each other? (What key factors and considerations should be made in ensuring the Green Architecture operates best?)

a) In its design (e.g. how AECM or Eco-schemes should be designed/funds allocated/improved)?

EU level	Cyprus
What is important at EU and MS level is to understand the failures of the past. Consider spatial planning than simply hectares in the various schemes Need simplicity (in implementation and monitoring)	Same here. It is important to understand the farmers profile; spatial planning.
	Simple/ easy to implement and monitor
I recognize that the subject of indicators has now been closed, but we need to be very clear about the existential threat to the new CAP from the lack of concrete targeting. The lack or vagueness of targets is akin to investing a huge effort and money in building the best sailing ship, and little effort in mapping the destination of the trip. The new CAP needs to include the costs of externalities, i.e. the costs of farming to the environment and human health, and reward	Same as for the EU. In Cyprus the setting up of impact based targets is a significant issue that needs further elaboration.

farmers who apply practices that minimize the externalities and transfer the cost to consumers (Guyomard et al. 2020, https://bit.ly/35HmZJg). In addition to more concrete targets, site or at least region specific data (NUTS2) are needed on input use in agriculture – especially for pesticides and fertilizers. While MS level data are useful, in many cases the general patterns of pesticide and fertilizer use in especially sensitive areas are averaged out. Regarding the three elements of the Green Architecture, I feel that more emphasis needs to be given on a) Setting easily quantifiable limits for Conditionality GAECs, and b) Linking the new Eco-schemes to specific targets. In other words, each approved Eco-scheme needs to come with an easily identifiable target, be it result-based or implementation based. Both AECMs and Eco-schemes need to be based on practices that have been shown to benefit biodiversity in scientific studies (e.g. www.conservationevidence.com)	
Understand the CAP failures of the past. Incorporate training for the farmers. Associate with measurable environmental impacts.	AECMs and Eco-schemes should be designed to be simple. Eco-schemes should be more ambitious, to address problems (e.g. a species need for conservation). Therefore, top-up funding should be attractive for the farmer and possibly cover the payment for expertise to measure the impact.

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	Your Member State (/region)
Consider four components: rationale/philosophy of measures; implementation; monitoring; farming culture.	Gauge interest in a bottom up approach and then design top – down (see past failures) Include Areas specific measures (i.e. geography) or context specific (i.e. farming culture)
	Evaluation of willingness to use on an annual level and preliminary results bi-annually. In case of low absorption, to be able to transfer funds to other measures

The EU and interested stakeholders need to be able to access information on strategic plan implementation on a yearly basis with a maximum lag of two to three years. Currently, it is practically impossible to assess the extent of measure implementation and use data for EU-wide scientific studies on the effect of different measures on environmental targets. The challenge lies mainly on the unavailability or inaccessibility of data or the different measures applied in different EU regions, farmer participation, and linked outcomes. Information technology permits the sharing of such data relatively easily, and the Commission needs to ensure that such data are publicly available and updated on a yearly basis. All data are kept by member states, it is a matter of sharing it with stakeholders and the public.	Same as for the EU – in Cyprus it is possible to collect such data through direct collaboration with the Cyprus Agricultural Payments Organization for Cyprus based researchers. It is much more difficult however for researchers based in other members states to locate, request and receive such data. And the same is true for virtually all MSs.
	Review the previous CAP results. Need to reduce bureaucracy to implement some of the measures. Area specific measures. Plan according to GAECs Avoid investing time/effort to Eco-schemes that might have high possibility to be abandoned after the first year.

Specific questions:

Q1.1: What are the most important pros and cons of each instrument?

Instrument	Pros	Cons
AECM		Long obligation for farmer
AECM	it looks good	
AECM	Long-term commitment, easier planning, allows for a more long-term and targeted intervention.	The long-term commitment acts as a disincentive for farmers. Compensation based on the income foregone approach, which is not very straightforward.
AECM	Multiannual and tested in the past.	Many of them not useful / adopted by the majority of the farmers (in Cyprus).
Eco-schemes	Flexibility for farmers	

	(annual no contractual commitments) Goes to genuine farmers	
Eco-schemes	Impact on long term	Uncertainty of amount might deter from use
Eco-schemes	Its annual duration, this could distinguish it from AECM, so farmers and AKIS can more easily find their way in all these complex, simplified regulations, especially if we focus it on annual rainfed crops	the only disadvantage to the advantage I mentioned, is that trees planted along annual crop fields, such as for biodiversity corridors or wind breaks, don't grow much in a year.
Eco-schemes	Not co-funded; top up payment	In the case of ambitious/demanding schemes, the payment might be considered low (Farmers will have to do something extra and get the same amount of payment). Expertise for design and implementation
Enhanced Conditionality	It looks good to me	
Enhanced Conditionality	Opportunity to adopt / incorporate many EU directives in Cypriot agriculture (e.g. water directive)	

Q1.2: How can the EU and Member States (MSs) reduce conflicts and maximise synergy among Green-Architecture instruments?

EU level	Your Member State (/region)
Need a complementary (between GA instruments), consistent in its application plan. Capacity building events: Provide training and decipher the schemes to farmers well before implementation	SAME HERE with emphasis on the profile of the farmers
Assure that the instruments are evaluated with different indicators, but have common/similar final output	
I see a potential for conflict between Eco-schemes and AECMs. The only difference being the yearly commitment for Eco-schemes, which is generally inadequate for achieving environmental targets.	See reply for EU

Q1.3: What are the barriers, caveats to consider?

EU level	Your Member State (/region)
The link and therefore financing of the same or similar activities between the two schemes	SAME HERE
	Raise interest among farmers for the different types of schemes Indicators are easy to monitor
It is possible that to avoid rocking the boat Managing Authorities will incorporate as Eco-schemes practices currently applied by farmers or practices requiring small change from business as usual. Managing Authorities in areas with an aging farmer population might be more prone to follow the approach, because of the unwillingness of farmers to change substantially their practices. Obviously, following a business as usual approach has limited value in achieving environmental targets.	See reply for EU
Time will be required to design the CSP.	The farmer profile in Cyprus / willingness to participate.

Q1.4: Are there (additional) CAP-instruments that should be considered for the Green Architecture? Under which conditions?

M13 on Areas under Natural Constraints might in some cases aid where AECMs and Eco-schemes are not attractive. Specifically, for the case of mountain agriculture, M13 supports the maintenance of agricultural activity and reduces land abandonment, which can negatively impact biodiversity conservation. While there is currently opposition to blanket payments made under M13, I feel that the measure is very constructive for biodiversity purposes on mountainous regions and small scale farmers.

Certification scheme for environmentally friendly production methods with specific targets of pesticide and fertilizer use reduction: This approach links CAP funding to market based approaches. In essence, CAP alone cannot achieve environmental objectives. The consumer must be convinced and pay part of the bill. Product footprint other certification approaches offer a potential link that offers to consumers the opportunity to participate in paying the environmental bill (e.g. Litskas et al. 2020 –0.3390/su12218812)

Q1.5: What should be defined as minimum requirements from MSs to ensure success of the Green Architecture as a whole?

Implement an evaluation mechanism (use, absorption, impact)

We need to develop a detailed 10-year plan on how to reach the Green Deal targets in Cyprus and expand and improve AKIS to support this.

Minimum requirements need to link to specific, quantifiable impact indicator targets. Actual targets need to be set for the three biodiversity relevant impact indicators (I.18-20), as well as for the indicators covering greenhouse gas emissions and pollution (I.10-I.17).

Consider local needs e.g. land abandonment, land degradation, desertification.

Design CSP based on lessons learned from previous CAP.

Q2: What can be the role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?

This is an opportunity for Cyprus to create synergies with existing conservation initiatives and target flagship species which merit protection under the Birds and Habitats Directives but also species in the Red Data Book of Cyprus given that some species are a) threatened by agric. Activities or b) dependent on continuation of certain management regimes

Implementation of measures with long-term impact, which may also need long time to show results. The results of these measures could serve as baseline for the next CAP/

The schemes should also deal with aspects that even though impact biodiversity/ agriculture were not used previously

While the Eco-scheme approach sounds enticing, wrong implementation may render it a double-edged sword.

By definition, Eco-schemes will be effective when they target environmentally damaging, high input systems with the aim of shifting them towards more sustainable practices. My understanding of the ring-fenced nature of the budget of Pillar 1 leads to the conclusion that the amount of total funds available to farmers will not change, but a percentage, probably around 20%, will be awarded to farmers through Eco-schemes. To achieve this, Managing Authorities will have the option of either reducing the area payments by 20% and award the savings to farmers participating in Eco-schemes. By definition, Eco-schemes must target important environmental problems, and therefore I expect a focus on intensive crop production systems. In essence, the approach leads to a reduction of area payments for (more) environmentally friendly forms of farming, and a shift of funds to more intensive farming systems. While valid arguments can be made for or against the approach, I feel that the most important problem is the anticipated risk of not linking Eco-schemes to clear and specific environmental outcomes. Cases might arise where the blanket reduction in area payments goes out to Eco-schemes targeting intensive crops, which will have none or very minimum positive environmental impacts.

An alternative approach would be to reduce funding for the most intensive crop types by a percentage that will result in savings of 20% of the total Pillar 1 funding to be awarded through Eco-schemes. However, such an approach will be unfair to farmers growing extensively a generally intensive crop. A consequence of the approach is that funds will be withheld from crops that are not considered sustainable and will be transferred to crops that are environmental under-performers.

An additional problem will arise for strategic CAP plans where farmers exhibit low interest in Eco-schemes. While it is not clear how Managing Authorities will be able to use funds earmarked for Eco-schemes if participation is low and funds are lost, the reduction in area-payments will be in vain.

The role of Eco-schemes: achieve ambitious goals (e.g. C sequestration, species protection, avoid land abandonment, circular agriculture). In the case of Cyprus, targeted interventions in specific areas (e.g. flag species)

What key factors and considerations should be made in ensuring the Eco-schemes are attractive (for MSs and farmers), effective, cost-efficient (in relation to the spent budget) and synergistic with AECM and other instruments? (Please remember that measures should fit to an annual scheme and applying for an Eco-scheme is voluntary for farmers)

a) In their design (e.g. how AECM or Eco-schemes should be designed/improved):

EU level	Cyprus
Consider improved spatial planning thus creating synergies from e.g. adjacency between targets or other elements of the landscape rather than simply number of hectares	Same here with emphasis given on areas well the countryside is still functional
Training: How the scheme can be implemented should be thoroughly presented	Training: How the scheme can be implemented should be thoroughly presented Bureaucracy: Reduce paperwork Value for money: For schemes that could have higher impact, increase funding. Funding should worth the time spent by farmers.
	Strong AKIS support, especially for Eco-schemes, so farmers stay with the scheme.
An Eco-scheme or AECM should be simple in its design and implementation. Eco-schemes must be linked directly to the achievement of biodiversity and climate impact targets. For instance, Eco-scheme x aims at leading to an increase of the FBI by x units. Or Eco-scheme y aims at reducing pesticide use by 20% each year, until a total reduction of 50% is achieved. Ideally, the Eco-scheme at the farmer's level will be management based and results-based at the strategic CAP plan level.	Because of the small size of the island and the lack of adequate resources to monitor input use and biodiversity indicators at regular intervals, I favour a management based approach at the farmer level, through their inclusion in certification schemes for specific targets. Such targets include reduction in pesticide use, the use of compost / other organic fertilizers and the maintenance of non-productive features beyond the minimum 10% required by GAEC 9. This is very important for Cyprus, where fields are of small size, with margins rich in wild vegetation. Up to now, farmers had a disincentive in maintaining non-productive features because the area was excluded from the area payments scheme, and Eco-schemes may offer a solution to the problem.
	Attractive = simple + income for the farmer Effective = baseline + knowhow (expertise/ advisory system) Cost-efficient = experiences from the past to avoid failure (due to e.g. bureaucracy)

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	Your Member State (/region)
Simplify application and monitoring procedures	SAME HERE
Involvement: Engage farmers in presenting their activities and impact to other farmers through workshops/ conferences Indicators: Use easy/ fast indicators to evaluate efficiency	Involvement: Engage farmers in presenting their activities and impact to other farmers through workshops/ conferences Indicators: Use easy/ fast indicators to evaluate efficiency
	Establish interdisciplinary (e.g., soil, water, nutrients, crops, pest management, economics) science-extension-producer AKIS teams, facilitated by an Extension staff to support on-farm research and demos with regional farmer producer groups, to achieve our new ambitious environmental targets!
Simple, simple and simple. Must be straightforward for a farmer to apply, easy to implement, and easy for the payment authority to evaluate compliance.	See answer for EU
	Key factor during implementation: effective monitoring system – possibility to correct / adjust CSP (e.g. Eco-schemes are annual and some things could be corrected if not working properly; e.g. increase payment, improve monitoring)

Specific questions:

Q2.1: What should be defined as minimum requirements for Eco-schemes to contribute to the success of the Green Architecture as a whole?

I believe this is now set to 20 or 30%
Reduction of nutrients in soil/ groundwater, Increase biodiversity
We need to reach important, ambitious EU targets, so it should have a strong, participatory research and extension (AKIS) component
Contribution to achieving the Farm to Fork and Biodiversity 2030 targets. Eco-schemes must be used to achieve the specific (and in many cases not so specific and measurable) targets of the Green Deal and associated EU policies.
Maximize farmers participation; feasible /doable interventions; avoid experimenting (e.g. apply practices that are tested and could have a measurable impact).

Q2.2: What are the pros and cons of a closed list-based approach (menu of options)?

Pros	Cons
Easier to be administered at an MS level	Perhaps not all options provided will be applicable in a country's geographical extent
Increase participation in selected options	Other important options may be left behind
MS can align the schemes with strong AKIS support.	Pressure from Farmer Unions to include or exclude selected schemes.
Easier for small scale farmers to implement	Restrictive approach, especially for large farms where environmental targets can be achieved via site-specific practices not available in a menu approach.
Better design (if stakeholders are involved).	

Q2.3: If the EU and MSs choose on a menu option, what would you list as examples that should or should not be included? *(Please remember that measures should fit to an annual scheme and applying to an Eco-scheme is voluntary for farmers)*

Examples of concrete, potentially-effective/cost-efficient Eco-scheme options that should be included:

At EU level	In your MS / region	Why?
	Any action that targets species associated with agricultural activities (+ive or -ive)	1 year in some cases might be enough to assist the recovery of a species population
Reduction of nutrient use	Reduction of nutrient concentration in soil (e.g. NH_4^+ , PO_4^-)	The reduction of fertilisers benefits biodiversity. The list should identify the major components required to be reduced
	Number of different annual plant species at field edge	The increased number of plant species (annual) indicates increased biodiversity
	MS: Organic, no-till rainfed cereal and legume forages (rotations and mixtures) planted with seed-drill, fertilized with processed animal manure, with strong AKIS support.	This scheme links with the GAECs. Thus, farmers already have to improve their practices, but if they participate in the Eco-scheme they will get AKIS support to do take it a step further, using state-of-the-art practices. Cereal and legume forage are the largest crop area in Cyprus, in low rainfall areas on soils low in organic matter (degraded by long-term, near-continuous mono-cropping). We need to improve the soil to

		make the land more resilient against climate change. Most crops are harvested whole for animal feed, so quality should not be affected by minor weeds. Large areas are tilled after harvest and left bare in summer, contributing to wind erosion, loss of fertile top soil and poor air quality. We also need to process and use manure. Many small and medium livestock farmers dump animal manure in the environment.
	Water: less water demanding varieties.	Decrease water use in agriculture.
Organic agriculture	Soils: Organic agriculture; organic material additions	Sustainable use of soil resources. Avoid soil degradation / desertification.

Examples of concrete, ineffective or problematic or cost-inefficient options that should not be included:

At EU level	In your MS / region	Why?
	Perhaps any action that targets processes rather than species might be problematic	one year is not enough for any action to allow a process to give results
	Any action that does not require “unnecessary” investment from the farmer	Simply because at least for the first time that a farmer enters the scheme should find as few “hurdles” as possible
	NOT: Number of different plant species at field edge	General description could direct farmers to plant new species
Increase area covered with landscape features to 15% of land ⁴	Same	Given that landscape simplification is one of the most important drivers of biodiversity loss, the increase in landscape features beyond the 10% of GAEC 9 can have a

⁴ GP: note that the likelihood for this to happen is low. In most MSs the protection level is too low i.e. below existing levels. Most workshops strongly advised to maximize the share of landscape features.

		substantial impact in achieving environmental targets (Zomeni et al. 2018, https://doi.org/10.3897/natureconservation.31.28397 www.agrolife.eu).
--	--	--

Q2.4: What are the pros and cons of a top-up payment versus income foregone? What would you recommend and why?

Pros	Cons
Semantics to start with: top up has a positive connotation (i.e. extra payment for a good deed rather than compensation for what's lost). Flexibility for farmers	Their short term nature and lack of commitment might not suffice to revert some damaging processes (might be used in an opportunistic manner)
A top-up payment can potentially reward practices highly beneficial for the environment without the limitations of the income foregone approach (such as having to collect detailed data to estimate income foregone)	Income foregone: Many small-scale farmers, especially on mountainous areas are part-time farmers. The income foregone approach pays for the actual cost of the scheme, which many farmers do not find appealing. For such an approach to work, the farmer needs to have extra time which will be charged as salaries in the income foregone approach. If the farmer does not have the extra time, he has no incentive in having themselves or employees to add something new in their daily tasks, and be reimbursed for the cost of their labour. In other words the approach fails to provide an extra incentive for the farmer to act, at least based on the Cypriot experience.
Could increase funding in ambitious schemes that target problems such as soil C increase.	Difficult to accurately estimate the amount for the top-up payment. Might be different in different areas/cases.

Q2.5: How should Eco-schemes best be organized spatially, among themselves and with respect to AECM? Please consider: How can this be promoted by the EU and administrated by MSs? How to balance cost-efficiency of the measure (focus on hot spot) vs. Broad scale application?

Spatial targeting (resilient countryside – landscape ecology approach; functional areas). Tying all these to ES and link it to the provision of ES. Areas prioritization (e.g. biodiversity; soils; water).

Implementation in biodiversity hotspot areas, for example at a buffer zone around Natura 2000 areas (as well as within) and other important areas.

For Eco-schemes focus on large scale impact with strong AKIS support, to reach our main environmental targets. For AECM focus on Natura2000 areas, mountains and catchment areas of dams (also mainly mountainous).

Eco-schemes need to focus on areas where agriculture plays a central role for biodiversity conservation / environmental impacts, so I prefer the focus on hot spot approach to maximize environmental benefits. Overlapping with AECMs would be ok if the two approaches target different types of problems / biodiversity conservation issues.

C sequestration: invest more on Eco-schemes in soils/ crops that have high capacity to store C. Biodiversity: hotspots. Baseline: A very well-defined baseline is needed and expertise for implementing/ monitoring.

Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?

S.M.A.R.T.: “Specific, Measurable, Ambitious/attainable, Realistic, Time bound”

Note: The Biodiversity strategy requires a) 10% landscape features, b) expansion of organic farming to 25% UAA and c) reduction in pesticide (impacts) by 50%.

What key factors and considerations should be made by MSs when setting targets in their CAP strategic plans, and how should the EU guide and assess them?

EU level	Your Member State (/region)
Targets should not be simply quantitative but also qualitative (i.e. looking at long term effects rather than snapshots in time) and spatially linked	SAME HERE
Targets should work synergistically with other EU strategies	Should be linked to some of the targets of the CY BD strategy and Desertification Strategy
Targets of new EU Biodiversity Strategy	Use targets set by Cyprus Biodiversity Strategy and other related strategies (e.g. Strategy for Desertification)
	We need to start from our current baseline and set incremental annual targets. Monitoring of landscape features, land management (e.g. no till) and crop rotations by Cyprus Agricultural Payment Organization, supported by national research organizations, using Copernicus satellite data and drones. Other indicators by CyStat (e.g., sales of fertilizer and pesticides) and Ministry (e.g., registry of organic farmers).
The three targets mentioned above are specific and measurable. Unfortunately, this is not the case with other climate / biodiversity targets, which creates existential problems for the new CAP. How can one judge success against a moving, or a non-existent target?	See reply for the EU. Cyprus needs to set specific and measurable environmental targets for the new strategic plan of CAP.
The EU Biodiversity Strategy to 2030 does not set up concrete goals for biodiversity conservation in agricultural land. Reduction in pesticide and fertilizer use by 50 and 20% respectively, as outlined in the Farm to Fork Strategy, are beneficial for biodiversity	Key factors: indicators selection (e.g. for pesticides impact reduction) is very challenging. I am not sure that “reduction in pesticide (impacts) by 50%” is clear. For impacts, very difficult to monitor in AECMs or Eco-schemes.

conservation, yet not biodiversity targets in their self. The bringing of at least 10% of agricultural area under high-diversity landscape features is expected to aid biodiversity conservation, but again it is not a biodiversity conservation target in itself. The issue has been thoroughly addressed in European Court of Auditors Special Report on Biodiversity on Farmland: CAP has not halted the decline (Special Report 13/2020). In addition, similar issues have been raised in Guyomard et al. 2020 (https://bit.ly/35HmZJg).	
---	--

Specific questions:

Q3.1: What could count as “ambitious” targets? (how do you measure ambition?)

Certainly not with numbers alone. Spatial extent is one, change in mentality is another
The targets set by the Strategies are “ambitious” but achievable. Indicators used for the Strategies can be used to measure if this “ambition” is reached.
The 2030 Green Deal targets are ambitious, because it is a sharp deviation of current trends.
The Green Deal, Farm to Fork Strategy, and Biodiversity Strategy set ambitious targets. A reduction in pesticide use by 50%, a reduction in fertilizer use by 25%, and an increase of organic farming to 25% are quite ambitious targets. Ambition is hard to measure, I would call it as progress beyond the expected, progress that requires innovations currently not in place / use to be achieved. It will depend on the MS and the environmental sensitivities of its citizens. I feel that the ambitious targets set in the Green Deal and relevant biodiversity/climate policies must be clearly reflected in the CAP. An ambitious CAP must meet the goals of EU policies on agricultural land.
Ambitious (very) is to reach the EU goals (e.g. roadmap 2050) for GHG emissions reduction and biodiversity protection. Also, to change farmers opinion on management practices (e.g. soil cultivation).

Q3.2: How should baselines be defined? (e.g. in terms of year, UAA/habitat cover etc.)

Baselines should rely on existing strategies or other management plans where available at the national level
Use the existing baselines of our various strategies and built on those, i.e. ha/year, concentrations of nutrients in soil, etc.
As above. For the 10-year time frame, we could also sample and analyse soil organic carbon in representative agricultural fields, with known management, to set a baseline, and measure every 5-years (it will change slowly).
Baselines need to reflect the end of the previous programmatic period to enable comparisons of target achievement between the new and the old period.
Use the existing baselines of Cypriot strategies and built on those.

Q3.3: What should/could be done so that MSs would be ambitious in setting, measuring and meeting the targets?

Get to know their “product” and their “users” better
The measuring/ evaluation should include individuals/ experts to monitor the implementation of the measures (through specific indicators)

Q3.4: What should MSs do to ensure that their targets translate into actions by farmers?

Recall that AECM and Eco-schemes are both voluntary. If they are not attractive, farmers will not take them up and, consequently, MSs may not be able to meet the targets.

Please try to provide concrete, feasible examples

Simplicity in the design, implementation and monitoring. Talking the “language” of the farmer
Implement targeted workshops, explaining to farmers the goals and proposed measures (what needs to be done, how, what is the potential benefit both monetary as well as increasing biodiversity in field).
See above. Our integrated AKIS research teams should include economists and close interactions with the Ministry, to support economically attractive schemes and measures.
“actions” are linked (like it or not) to income or cost reduction. A CSP could be designed using the following way. In Cyprus branding and certification could lead to income increase. Transition to more sustainable farming systems x certification x branding x income.

Q4: How can science improve the way indicators are used for performance evaluation of the CAP?

Note that the CAP comprises Output, Result and Impact indicators and in the next period also Complementary Result Indicators (CRI). Annexes are closed but a) methods can be improved and b) the CRI requires indicators for biodiversity.

Specific questions:

Q4.1 How can landscape features be best mapped? (Impact indicator to be used in the next CAP. Needs to be up to date, detailed)? It is feasible in your country?

Indicator	Justification	For which MSs?
Stonewalls length/density	This feature is related with increased resilience and functionality of the countryside.	Cyprus and other Med countries
Canopy areas of trees in annual crop lands Terraced agricultural land (UAA) Length of dry stone walls.	Biodiversity, cultural heritage, reduce soil erosion.	Cyprus

Q4.2 How can the methods for biodiversity indicators be improved, for the habitats and species of the Habitats Directive? (Impact indicator to be used in the next CAP). It is feasible in your country?

Indicator	Justification	For which MSs?
		In Cyprus is not so much about method improvement by due to country's small size there is often not enough critical mass to carry out on time what is required
Farmland Birds Indicator	Good indicator of environment status, including habitat quality	CY – feasible
Specific Plant existence	Plants form part of habitats in Habitats Directive. The presence/ absence would indicate if measure is efficient	CY – feasible

Insect number	Species included in Habitats Directive	CY – limited number of experts (farmers can be trained for identification and verification by experts)
Selected indicator species (conduct local research to identify these)	Biodiversity	All

Q4.3 What are the best biodiversity indicators that can be proposed for the Complementary Result Indicator (FA 4A)?

“Restoring, preserving and enhancing biodiversity, including in NATURA 2000 areas, and in areas facing natural or other specific constraints, and high nature value farming, as well as the state of European landscapes”. See also here: https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/complementary-result-indicators-pillar-ii_en.pdf

Note: such indicators should be feasible to collect and analyse in multiple MSs, they have a running monitoring system, and can clearly interlink CAP measures and biodiversity.

Indicator	Justification	For all MSs?
1.HNVf	Has been used in the past and reflects most of the properties of these type of indicators. In addition resources have been allocated EU wide.	Yes despite its variations
2.Butterfly – related index 3.Pollinator- related index	Butterflies are a good indicator of the state of the agro-ecosystems As above	Yes there is an ongoing monitoring initiatives Perhaps not immediately but there is an urgent need to increase and consolidate efforts which have started 10 years ago
Farmland Birds Indicator	Good indicator of environment status	YES
Butterfly species	Good indicator of environment status	YES – but number of experts may be limited to some MSs

Insects/ Pollinators	Good indicator of environment status	YES – but number of experts may be limited to some MSs
indigenous species and local landraces		all
Status of a key pollinator species in agricultural lands	Linking indicators to pollinators is extremely important, because in addition to their biodiversity value, they offer the crucial ecosystem service of pollination and are the focus of the EU pollinators initiative (https://ec.europa.eu/environment/nature/conservation/species/pollinators/pdf/EU_Pollinators_Initiative-English-C-web.pdf)	All MS?

Reply France

Workshop facilitators: Cécile Détang-Dessendre, Pierre Dupraz, Hervé Guyomard, Clelia Sirami

Participants: Marc Benoit (INRAE, Economics), Jean-Christophe Bureau (AgroParisTech, Economics), Thierry Caquet (INRAE, Ecology), Vincent Chatellier (INRAE, Economics), Luc Delaby (INRAE, Animal Sciences), Cécile Détang-Dessendre (INRAE, Economics), Bertrand Dumont (INRAE, Animal Sciences), Pierre Dupraz (INRAE, Economics), Michel Duru (INRAE, Agricultural Systems), Alexandre Gohin (INRAE, Economics), Hervé Guyomard (INRAE, Economics), Catherine Laroche-Dupraz (Agrocampus Ouest, Economics), Jean-Louis Peyraud (INRAE, Animal Sciences), Guy Richard (INRAE, Agronomy), Jean Roger-Estrade (AgroParisTech, Agronomy), Clélia Sirami (INRAE, Ecology), Julie Subervie (INRAE, Economics), Olivier Therond (INRAE, Agronomy, Agricultural Systems), Sophie Thoyer (INRAE, Economics), Aurélie Trouvé (AgroParisTech, Economics)

Workshop date: 01.12.2020

Q1: How can the different Green-Architecture elements optimally complement each other?

(What key factors and considerations should be made in ensuring the Green Architecture operates best?)

a) In its design (e.g. how AECM or Eco-schemes should be designed/funds allocated/improved)?

EU level	France
Enhanced conditionality (no climatic and environmental dumping, no distortions between Member States) As much as possible, penalties for non-compliance with conditionality requirements must be proportional to climatic and environmental damages (rather than linked to CAP payments only) Eco-schemes essentially targeted on global public goods (climate mitigation, biodiversity preservation/restoration) -No race to the bottom -Remuneration of efforts beyond baseline requirements of conditionality	Agri-environmental and climatic measures (AECM) of Pillar 2 essentially targeted on local public goods (soils, water, air, landscapes) -Remuneration of efforts beyond baseline requirements of conditionality -Increased ring-fenced budget (relatively to the current requirement of 30%)

-Two ring-fenced budgets for Eco-schemes (one for climate interventions, one for biodiversity interventions) in order to cover both climate mitigation and biodiversity preservation objectives	
---	--

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	France
Enhanced conditionality and Eco-schemes rules should be defined at the EU level and then translated into National strategic plans (NSP) through quantified targets negotiated with the EC in order to ensure their compatibility with EU climatic and environmental objectives and targets of the Green Deal	AECM should be implemented at a regional level in order to take into account local needs related to local public goods

Specific questions:

Q1.1: What type of measures should each Green-Architecture instrument focus at from an environmental perspective?

Instrument	Should cover...
AECM	Local public goods such as soil, water and air quality, the maintenance of open and diversified landscapes, recreation ecosystem services (hunting, angling, etc.)
Eco-schemes	Global public goods, that is, climate mitigation, biodiversity preservation/restoration + animal welfare + Green Deal targets related to agricultural GHG emissions and the use of chemical inputs (pesticides, fertilizers and antimicrobials)
Enhanced Conditionality	Minimum requirements for both global and local public goods through SMR and BCAE; -No backsliding -Whole agricultural area (no exemption/exception) -Increasing baseline over the programming period (increasing requirements over time) -Obligation for farmers to report emissions, fluxes and uses related to Green Deal quantitative targets in order to base incentives (Eco-schemes and AECM) on these reported figures

Q1.2: Which conflicts between instruments, that you are aware of, can be resolved in the new Green Architecture and how? (at EU level or in your country)

Problem	Solution
Two instruments (Eco-schemes in Pillar 1 and AECM in Pillar 2) targeted on climatic and environmental objectives with potential overlapping Several public goods have characteristics of both global and local public goods: case, in particular, of biodiversity Synergies/antagonisms between environmental objectives Support to organic farming in Pillar 1 (Eco-schemes) or Pillar 2 (AECM)	Eco-schemes of P1 on global public goods because fully funded by the EU budget, and AECM of P2 on local public goods because co-funded by national/regional authorities For biodiversity, past and current AECM have/have had positive effects but only at a local scale insufficient to reverse the biodiversity decline in European agro-ecosystems; as a result, proposal to include the biodiversity preservation/restoration objective in Eco-schemes in order to cover the whole agricultural area of the EU (in order to increase the ambition everywhere in the EU) Important and difficult issue when there are antagonisms with no simple solution; hence, necessity of a case-by-case study In Pillar 2 as the effects of organic farming on climate may be ambiguous (possibly/likely, more GHG emissions per kg of product)

Q1.3: What should be quality criteria for the EU Commission to evaluate ambition in the Member States' [your country's] Strategic Plans? (e.g. minimum requirements from MSs to ensure success of the Green Architecture as a whole)

No backsliding principle for conditionality

Ring-fenced budgets for both the Eco-schemes in Pillar 1 and AECM in Pillar 2

NSP must include quantified indicators effectively correlated with expected climatic and environmental impacts; for example, indicators corresponding to pesticide uses/sales rather than areas concerned with actions aimed at reducing pesticide uses; idem for the uses of fertilizers and antibiotics, gross and net GHG emissions, high diversified landscape features

National indicators must be defined in relation to EU targets (contribution of each MS to the EU ambition and objectives)

NSP should document causality relationships between farm level measures and climatic and environmental results at the region and country level

Q1.4: Under which conditions could other CAP-instruments be considered as contributing to the Green Architecture? (E.g. Areas of Nature Constraints, investments, AKIS/consultancy, sectoral payments or DP (coupled/non-coupled) etc.)?

Other CAP instruments could be considered as contributing to the climatic and environmental objectives only if MS really document (explain) causality relationships between a given instrument and the climatic and environmental objectives to which it contributes

Agricultural investment support should be effectively conditioned to the respect of climatic and environmental objectives

Q2: What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?

Targeted on global public goods (climate and biodiversity) based on quantified targets
 Eco-scheme measures support farmers for efforts that go beyond minimum requirements included in conditionality requirements: each MS should clearly document how it aims at achieving climatic and environmental objectives by using the whole set of instruments of the CAP green architecture (and taking into account possible negative of other CAP instruments)
 Payments should be granted in line with climatic and environmental services, and increased with the provision of services, instead of compensating additional cost/profit losses (as it is the case currently with AECM) – the Green Box argument should not be used as an argument not to link payments to services
 Eco-schemes should also support changes in practices aimed at improving animal welfare
 One issue is of course the trade-off between the attractiveness of measures for farmers and the budgetary costs of these measures: necessity of impact assessments in order to maximise the efficiency of Eco-schemes (maximisation of climatic and environmental benefits for a given ring-fenced budget for Eco-schemes); the same logic should apply to AECMs

What key factors and considerations should be made in ensuring the Eco-schemes are attractive (for MSs and farmers), effective, cost-efficient (in relation to the spent budget) and synergistic with AECM and other instruments? *(Please remember that measures should fit to an annual scheme and applying for an Eco-scheme is voluntary for farmers)*

a) In their design (e.g. how AECM or Eco-schemes should be designed/improved):

EU level	Your Member State (/region)
Ambitious budget in order to ensure a "sufficient" environmental ambition and the attractiveness for farmers	Idem
The measures should support collective commitments (from a few farmers to a large group within a territory) for environmental objectives where there is evidence that collective commitment is more efficient (case, for example, of biodiversity); this could be achieved through agglomeration bonuses	Idem
Development of impact indicators relying measures to climatic and environmental impacts; as a result, necessity to improve, in each MS, the information system	Idem
An improved information system relying on information collected in an automatic way (through satellites, sensor...) should also reduce control costs	Idem

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

(NA)

Specific questions:

Q2.1: What are the pros and cons of a closed list-based approach (menu of options)?

Pros	Cons
A well-designed list of options should prevent insufficient climatic and environmental ambitions The more you adopt options within the menu, the higher the payments ("point system"); by this way, also incentives to adopt an higher number of measures Necessity to document how the different options of the menu allow the achievement of climatic and environmental objectives (causality, quantification)	Dissolution of effects if the list is too large or includes (numerous) less ambitious measures that farmers can choose, which allows them not to select more ambitious measures (as it is the case, for example, with requirements of current greening measures) On the other hand, a too limited list of options would limit the climatic and environmental ambitions Calibration of the list of options to the budget/the ring-fenced budgets

Q2.2: If the EU and MSs choose on a menu option, what would you list as examples that should or should not be included? *(Please remember that measures should fit to an annual scheme and applying to an Eco-scheme is voluntary for farmers)*

a) Examples of concrete, potentially-effective/cost-efficient Eco-scheme options that should be included:

At EU level	In your MS / region	Why?
Permanent grasslands	Idem	Climate mitigation (carbon storage) + biodiversity (bonus for legumes) + water quality; payment increasing with the age of permanent grassland Climate mitigation + biodiversity Essentially biodiversity (payment increasing with a diversity index, bonus for small size plots), both rotation AND crop diversity are important
Wetlands and peatlands	Idem	
Crop rotation and diversity	Idem	
Arable crop covering	Idem	

High diversified landscape features	Idem	Biodiversity + climate mitigation + soil erosion
GHG emissions and uses of fertilizers, pesticides and antibiotics)	Idem	Biodiversity and climate mitigation (payment increasing with the share of agricultural area devoted to landscape features, bonus 1 for rare infrastructures at a local level, bonus 2 for spatial continuity at a local level) Eco-schemes directly related to agricultural Green Deal targets; payments for efforts (for example, when emissions or uses are lower than the mean/median) with penalties when the situation deteriorates

b) Examples of concrete, ineffective or problematic or cost-inefficient options that should not be included:

At EU level	In your MS / region	Why?
Precision farming		Precision farming is important for reducing inefficiencies. Would be more efficiently supported by investment support rather than through Eco-schemes measures. Precision farming is a means that can be used to achieve climatic and environmental objectives allowing the farmer to receive Eco-scheme payments thanks to this improvement

Q2.3: What are the pros and cons of a top-up payment versus income foregone? What would you recommend and why?

Pros	Cons
Possibility to (better) link the top-up payment to climatic and environmental services and thus to introduce payments for services	The measurement of services may be complex (necessity of proxies) and costly (necessity to develop an efficient and complete information system)

Q2.4: How should Eco-schemes best be organized spatially, among themselves and with respect to AECM? *Please consider: How can this be promoted by the EU and administrated by MSs? How to balance cost-efficiency of the measure (focus on hot spot) vs. Broad scale application?*

In a context where AECM are locally targeted, Eco-schemes should cover the whole EU agricultural area (condition for climatic and environmental objectives not limited to specific areas)

Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?

S.M.A.R.T.: “Specific, Measurable, Ambitious/attainable, Realistic, Time bound”

Note: The Biodiversity strategy requires a) 10% landscape features, b) expansion of organic farming to 25% UAA and c) reduction in pesticide (impacts) by 50%.

What key factors and considerations should be made by MSs when setting targets in their CAP strategic plans, and how should the EU guide and assess them?

EU level	France
Quantification of EU targets	Quantification of MS targets defined in line with EU targets (issue of effort sharing between the different MS; necessity to take into account past efforts in order to reward MS that have made efforts in the past with respect to MS that did not; necessity to ensure that the sum of national efforts/targets corresponds to the EU efforts/targets)
Legally binding targets	Legally binding targets
Well-developed information system	Well-developed information systems to reduce public and private administration costs and link measures to targets and impacts.
Dissuasive penalties when non-compliance and bonuses when results are better than ex ante defined targets	Idem

Specific questions:

Q3.1: What should count as “ambitious” targets? (how do you measure ambition?)

Measuring ambition and defining ambitious targets is particularly difficult (easier to note that actions are not sufficiently ambitious when one observes, for example, the continuous decline of biodiversity in agro-ecosystems thanks to “simple” indicators, for example the number of common birds).

A pragmatic advantage of the Green Deal is to propose numerous quantified targets for agriculture, more specifically for numerous variables that should, if the targets are respected, reduce the climatic and environmental footprint of EU agriculture. A pragmatic approach would be therefore to translate the EU targets for each MS (taking into account past efforts of each MS in order to “reward good performers and to penalize bad performers”

Q3.2: How should baselines be defined? (e.g. in terms of year, UAA/habitat cover etc.)

The baseline should take into account, on the one hand the Green Deal targets for agriculture (to ensure that the sum of national targets fits with the EU targets), on the other hand the efforts already made by the MS over the recent years (for example, the five past years) in order not to penalize those MS that already made (important) efforts

Q3.3: What should the EU demand from your MS to clarify in its targets?

The EU should demand that each MS explains how the measures retained in its NSP will allow the achievement of climatic and environmental targets (ex-ante requirement), and over the CAP programming period, how the measures adopted do contribute to the achievement of the targets and place the MS agriculture on the right tracks (causality relationships, indicators). If necessary, the EU would demand the MS to design and implement corrective actions, with dissuasive penalties in case of non-compliance

Q4: How can science contribute on indicators and the way they are used for performance evaluation of the CAP?

Note that the CAP comprises Output, Result and Impact indicators and in the next period also Complementary Result Indicators (CRI). Annexes are closed but a) methods can be improved and b) the CRI requires indicators for biodiversity.

Specific questions:

Q4.1 How can landscape features be best mapped? (Impact indicator to be used in the next CAP. Needs to be up to date, detailed)? It is feasible in your country?

Indicator	Justification	For which MSs?
Mapping of biodiversity reservoirs (from various field data and various documentation sources), including in Natura 2000 designated areas and other national and regional designated areas of ecological interest Mapping of ecological corridors (from various field data and various documentation sources, including administrative and academic resources)	https://inpn.mnhn.fr/programme/trame-verte-et-bleue/carte-nationale	Consolidated maps at the French national level, based on Regional schemes of ecological coherence Requirement for all MS

Q4.2 How can the methods for biodiversity indicators be improved, for the habitats and species of the Habitats Directive? (Impact indicator to be used in the next CAP). It is feasible in your country?

Indicator	Justification	For which MSs?
Semi-natural landscape elements listed in EFAs and largely absent in the present implementation of the CAP	Combine field observations and remote sensing to validate the remote sensing detection of semi-natural elements (hedges, ditches, ponds and dikes, etc.)	All MS

Q4.3 What are the best biodiversity indicators that can be proposed for the Complementary Result Indicator (FA 4A)?

(NA)

Reply Germany

Workshop facilitators: Maren Birkenstock (Thünen-Institute of Rural Studies), Sebastian Lakner (University Rostock), Guy Pe'er (UFZ/ividiv), Norbert Röder (Thünen-Institute of Rural Studies),

Participants: Stefan Ewert (Greifswald Moor Centrum), Peter Feindt (Humboldt University), Anna Häring (HNEE), Alexandra-Maria Klein (University Freiburg), Hermann Lotze-Campen (PIK Potsdam), Rainer Oppermann (IFAB), Karin Reiter (Thünen-Institute of Rural Studies), José Luis Vicente Vicente (ZALF), Catrin Westphal (University Göttingen), Sabine Wichmann (Greifswald Moor Centrum), Yves Zinngrebe (University Göttingen)

Workshop date: 16.10.2020

Q1: How can the different Green-Architecture elements optimally complement each other?

a) In its design (e.g. how AECM or Eco-schemes should be designed/funds allocated/improved)?

EU level	Your Member State (/region)
The Green Architecture should be integrated with the „from Farm to Fork strategy” and other strategies conforming the new Green Deal.	The following argument emerged in the group: Special focus on fostering multifunctionality of landscapes, avoiding land abandonment and concentration of land, and supporting local small farmers. Some participants did not agree with this argument, as in their opinion "land abandonment" is not a central problem in Germany. Similarly, there is no empirically verifiable evidence that the concentration of land ownership has an impact on environmental performance.
The Green Architecture should include landscape design aspects and means how this could be achieved (cooperatives, counties),	Set regional biodiversity targets, consider existing biodiversity/habitats and implementation at landscape scale
Require from the MS in the Strategic plan an ex-ante assessment (with quantification) which extent of measures is required to achieve the different goals codified in the European Environmental law relating to agriculture (e.g. Nitrates, Habitats, Birds, Water framework, ...)	Clarify the roles of the CAP instruments and other national support instruments (EEG / climate fund) Clearly identify the target areas and identify the most appropriate instrument (e.g. GHG-mitigation ==> conservation (rewetting) of

Clear / transparent rules how RDP-instruments can qualify Eco-schemes providing a “incentive” for farmers for participating in qualifying measures Clear rules how the potential income component of the Eco-schemes is calculated and reported (avoid greenwashing) If the remuneration of Eco-schemes is not based on income foregone / cost incurred; the payment level should reflect ecological effectiveness per unit of support Increase the flexibility in the cost calculation so that the incentives given by the payment better reflect the public benefit and not only the associated costs In case of synergistic programs focus the output and result indicators on simple alphanumeric calculations (weighting factors). Centralize attention and support to landscape elements and low-input pasture-based livestock systems. The latter comprise a prominent share of High-Nature Value farmland, but perform much below average in terms of economic indicators. They are disappearing or near-extinction in many parts of the EU.	peatlands ==> in NE-Germany ==> non-productive investments Agree on a target budget per region over all CAP measures Balance monetary flows of support payments between regions with the allocation of RDP and federal funds Clear focus of instruments especially if farmers can select from a portfolio and no approval mechanism is applied (the budget for and the focus to tackle different ecological challenges should not be subject to the farmers decision only) Ensure that remuneration is sufficient to guarantee a profitable management of esp. species rich grasslands in the medium to long run Ensure that all habitat types and habitats of species of European concern that depend on agricultural management are eligible for payments Have a sanctioning and payment system that is not creating perverse incentives.
Focus Peat- and Wetlands <i>The needs of peat- & wetland were discussed in the group. Considering the administrative background AEEM and Eco-schemes only partly suit here. Better would be climate funds and non-productive investments (funds should have different focus; otherwise legal problems of double funding). Nevertheless, we would like to briefly present the points of content</i> Conditionality on peatlands: Drained, agriculturally used peatlands are only 3% of the EU's agricultural land but contribute 25% of the EU's agricultural greenhouse gas emissions. → An ambitious GAEC 2 needed, in order to achieve a paradigm shift in the use of carbon-rich soils. → Include ALL carbon-rich soils (i.e. organic soils according to GHG reporting under UNFCCC) for area effected by GAEC 2 (new layer in LPIS), NO limitation to e.g. Natura 2000 sites	Focus Peat- and Wetlands: <i>The needs of peat- & wetland were discussed in the group. Considering the administrative background AEEM and Eco-schemes only partly suit here. Better would be climate funds and non-productive investments (funds should have different focus; otherwise legal problems of double funding). Nevertheless, we would like to briefly present the points of content</i> NO limitation of GAEC 2 to sensitive areas, e.g. Natura 2000 Allocation of climate protection funds for rewetting peatlands and initiating and maintaining paludiculture (i.e. productive use of wet and rewetted peatlands): In Germany, rewetting drained peatlands is the most effective measure to reduce GHG emissions from agriculture and other land use: 7% of agricultural land is drained peatland, but it accounts for 37 % of GHG emissions from agriculture and agricultural land use

- EC proposal on GAEC2 was „Appropriate protection of wetland and peatland “ - AGRIFISH Council: “Minimum protection of wetland and peatland at the latest by 2025” → NO postponing: risk of announcement effects; urgent need for action on carbon-rich soils - EP proposal is „Effective protection of wetlands and appropriate maintenance of peatlands” → no change if it implies that drained peatlands can remain in their drained state and continue to cause high CO2 emissions! → Single voluntary measures (Eco-schemes, AECM, ...) are insufficient - The suggestion was under discussion: „Immediate minimum protection for wetland and peatland, increasing to effective protection of wetland and peatland in 2030. → 1st step: non-deterioration rule: e.g.no newdrainage, no deepening of existing drainage level, no irreversible transformation of the soil profile such as deep ploughing allowed → 2nd step: requirements for improvement e.g. conversion of arable land into wet grassland or paludiculture, creating infrastructure for water retention etc. up to prescribing minimum water levels <i>This suggestion will at least in North-West-Germany raise the problem that farmers will largely quit the CAP. An adaptation of the ordinance law is needed for this suggestion. The reason for this: a drainage level can't be regulated by the CAP as the regulation of the ditch drainage level is not in the domain of the farmer. The only chance: newly drained sites lose their status as eligible areas. Additionally, it needs clear priorities between climate protection and Water framework directive: here e.g. weirs in relation to permeability of water bodies</i> - Provide transformation support to peatland rich regions and farms for coping within increasing level of requirements: drainage-based to raising water levels (according to the Paris Agreement all peatlands must be wet in2050)	
--	--

<i>Discussion: Does it make sense to include "Economic incentives for climate smart agriculture on peatlands in the EU?"</i> <i>- AECM and Eco-schemes are so far not suitable.</i> <i>1) Clarify that conversion of grassland on organic soils to paludi-culture doesn't count as grassland conversion</i> <i>2) Clarify that paludiculture are eligible for Direct payments</i>	
---	--

a) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	Your Member State (/region)
As I said before, integrating the CAP with other strategies (soil, biodiversity, green deal, from Farm to Fork, Paris Agreement (NDCs), etc.) it is urgently needed.	To distinguish between different regions/states having very different geomorphological, economic or cultural characteristics. That is allocating of monetary resources should depend on these characteristics. For instance, in valleys or mountains, where mechanization is much more complicated,
	Strategic plans so that measures can be implemented at larger spatial scales, define biodiversity and landscape heterogeneity targets which could be used as benchmark for the realized levels
- Clarify what is the environment. problem in the MS (keep the environment. State (problem abandonment / or intensification); or extensification of the system (to high intensity)) - Focus in the notification less on the payment levels esp. for measures leading to an extensification and more on the question is the designated output sufficient to markedly reduce the environmental problem Ensure transparency on what is supported in the MS (database with description of the measures and the supported areas) as detailed as possible	

	Setting clear the rationale to spatially distribute the measures: - Focus on the most efficient (effective sites only or ensure a certain minimum endowment) Focus Peat- and Wetlands: <i>The needs of peat- & wetland were discussed in the group. Considering the administrative background AECM and Eco-schemes only partly suit here. Better would be climate funds and non-productive investments (funds should have different focus; otherwise legal problems of double funding). Nevertheless, we would like to briefly present the points of content</i> Supporting the transformation of peatland rich regions and farms with the entire bunch of 2nd pillar instruments, e.g.: - AECM for high water levels - Consulting - Cooperation, e.g. water management for hydrologic. Units - Investment in hydrological feasibility studies and implementation costs (raising water levels by blocking ditches, adaptable outflows etc.) - Investment for adapting utilisation to raised water levels: wetland crops, harvesting machines with low ground pressure, processing facilities for biomass from rewetted peatlands Considering Eco-schemes for rewarding the maintenance of high-water levels on peatlands and supporting paludiculture
--	---

Specific questions:

Q1.1: What are the most important pros and cons of each instrument?

Instrument	Pros	Cons
AECM	Context dependent, but presumable most efficient measures to promote biodiversity	Farmers question the control mechanisms (i.e. not flexible enough)
AECM	Established system known to farmers and administration	Only accompanying effect, Insufficient to reach the diverse targets (biodiversity, climate mitigation, water protection), e.g. too little financial resources (limitation of budget share) and too little money spent for targeted actions

AECM		Focus on compensation on income foregone / cost incurred can induce perverse incentives (more ambitious programs have more obligations → more chances to unintentionally non-comply; however, “real income component” equivalent to low ambitious programs)
AECM		Current Sanctioning algorithm can cause even for minor non-vital infringements (no effect on the environmental outcome) of the obligation can have drastic financial consequences
Eco-schemes		No selection process by farmers, implementation is after the design phase to the farmers choice only
Eco-schemes		It would be good to have regionalized schemes. Eco-schemes are from a German administrative perspective not suitable for this.
Eco-schemes	High interannual flexibility (increases uptake by farmer, esp. arable farmers with short term lease contracts); good where ecological relevance of action changes from year to year (e.g. breeding sites of ground breeding birds)	High interannual flexibility (only few options make really sense; mechanisms in the design are needed to ensure spatially targeted and multiannual implementation)
Eco-schemes	100% funding, mainly important for financially weak countries and German federal states Option to set payment levels independent of income foregone → Change in the framing possible (farmers provide an environmental service, and are not compensated for additional restrictions only)	The federal government's claim that there should be no redistribution of funds between the federal states = "knockout argument" for any peatland rewetting measures, since peatlands are distributed very unevenly in Germany Annual measures seem to be rather unsuitable for peatlands, since peatland rewetting is a long-term decision without option of return → multi-annual programs needed providing farmers a long-term perspective to become a “carbon farmer”
Enhanced Conditionality	Baseline measures that can help to reduce inputs	Rather low impact on biodiversity
Enhanced Conditionality	So far, policy targets and implication for agriculture are not clearly	Risk: Opting-out: Very strict, immediate requirements may

	communicated and translated to farmers Extended conditionality can set a new course for farming, e.g. in peatland management, ambitious minimum requirements needed	lead to “opting out”, i.e. farmers may waive CAP payments for organic soils, split the farm and continue drainage-based peatland use with a separate enterprise outside of the LPIS system.
Enhanced Conditionality		Addresses only farmers and not land owners → much more limited options compared to ordinance law

Q1.2: How can the EU and Member States (MSs) reduce conflicts and maximise synergy among Green-Architecture instruments?

EU level	Your Member State (/region)
Clarify and rank the goals, what is the primary target what is auxiliary. Currently a lot of the goals are conflicting	I think that the question is similar that at EU-level. How important are the environmental goals (biodiversity, GHG emissions, soil conservation...), food (food self-sufficiency, shorten food supply chains...) and social goals (population fixation, preserving genetic diversity of livestock...) compared to just increase the crop production?
	Cooperative and participatory approaches; transparent communication in the design and implementation phase
Phasing out of all CAP payments for agriculture on drained peatlands (direct payments, agri-environment-climate schemes, investment promotion for drainage systems etc.) that promote indirectly the draining of peatland and increase opportunity costs and thereby required payments for peatland rewetting.	
	Clearly analyze whether integrative approaches are more sensible or segregate ones in a given regional context (streamline the measures respectively); communicate a clear pathway esp. if long term adjustments are needed.

Q1.3: What are the barriers, caveats to consider?

EU level	Your Member State (/region)
Eco-schemes compete with 30% share for agri-environmental measure in the 2nd pillar ==> a) ring-fencing over both pillars; b) if Eco-schemes have an income component; only the not income relevant part should be attributed to this share	Not all regions / farms are affected equally by the instruments of the 1. Pillar (Eco-schemes) / enhanced conditionality ==> redistribution of funds (hot political issue)
See above: continued 1st and 2nd pillar support for drained peatlands Unintended effect of a general ban on the conversion of grassland (via GAEC): Grassland on drained peatland sites emits large amounts of GHG. Paludiculture after rewetting yields considerable GHG saving, but (in case of cultivation of e.g. reeds, Typha and Sphagnum moss) needs a conversion of grassland into permanent crops. Grassland conversion should therefore be permitted if it can be shown that it protects the climate. (Unless there are nature conservation reasons for maintaining a specific grassland site).	2nd pillar supports keeping up farming: - AECM, e.g. for the “extensive utilisation of grassland” without addressing higher water levels on peatland - Investment support, e.g. for a stable for dairy cattle fixes farm practices based on draining peatlands for another decade or more
	Payment rules: - Fear from Envi Administration that an ambitious 1st pillar will deter the “implicit income component” from ambitious 2nd pillar programs
	Time: - The plan and the interplay of the instruments cannot be designed before many technical issues are clear on the EU scale; However, these won't be fixed before summer and the plan must be submitted on 1.1.2021; also, IT implementation requires time
	Administrative Structure: - for the federal government an integrated planning and design approach with stakeholder involvement is new. During last CAP-period stakeholder involvement was organised for the 2nd pillar from German Federal states (“Länder”)

	- 1 st pillar responsibility of Member State; 2 nd pillar and implementation of legal requirements of Federal states
--	--

Q1.4: Are there (additional) CAP- instruments that should be considered for the Green Architecture? Under which conditions?

- Flexibility rules regarding administrative and measuring burdens
- There are much more useful instruments in pillar 2 than only AECM, i.e. financing advice, financing cooperation (e.g. for joint water management in hydrological units at landscape-scale), supporting investment for initiating transformation to climate smart agriculture on peatland (e.g. crops and harvesting machines adapted to water saturated soils)
- Definition of eligible area is relevant especially with respect to grasslands, structural rich areas, paludiculture
- Definition of minimum utilization: Requirement to mulche the entire area is an ecological night mare
- Absolute Ban to use non-productive areas late in the year is counterproductive (Late partial harvest would be frequently beneficial)
- 5-year rule for Grassland prevents voluntary establishment of longer term fallows and buffer structures on arable land
- Coupled support could be beneficial to support grazing in case underutilization is a problem or to support orphan crops with strong environmental benefits

What should be defined as minimum requirements from MSs to ensure success of the Green Architecture as a whole?

- At least 40 % budget payments, for both, Eco-scheme within 1 st pillar and AECM within 2 nd pillar
- At least 10 % dark green measures in intensive agricultural landscapes and 20 % dark green measures in average of a whole country should be achieved (both >10% / 20% in arable land and >10% / 20% in grassland)
- No application of pesticides in all Esc in the whole year (till 31/12/),
- reduced fertilisation,
- no-agricultural / energetic -use-time-intervals (e.g. 01.may – 30. June) in Esc
- whole year measure for Esc (no tillage till 31/12)
- Clear intervention logic, relevant allocation of funds to effective funds (limit windfall profits); methodology to assess the ambition level; the budget share is not per se appropriate as Eco scheme can have an income effect

Q2: What can be the role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?

- I think that part of the Eco-schemes could be “transferred” to the mandatory (i.e. conditionality) part. That is, to select the agricultural practices that are the “most relevant” in terms of environmental impact and include them in the conditionality part. Otherwise, we will have the risk, again, that farmers would not feel the necessity to apply the sustainable management practices. - So, based on the scientific evidence, the conditionality part could be enriched by taking part of the Eco-schemes.
- Filling the gap between good agricultural practice and AECM - Broad scale implementation of Eco-schemes (high percentage of Eco-schemes – high uptake)
- Multi-actor and cooperative approaches, include existing structures
- Best Option: Point system (with degressively for some payment with increasing share (e.g. fallow)) - Pre-allocate the payment to the farms (less problems with deriving the wright payment level to avoid over / undershooting the budget; less problems with redistribution effect among farms and regions) - Gradually increase the share of Eco-schemes on DP from year to year. - Unused funds for Eco-schemes could be transferred to the 2nd pillar for environmental related expenditures
- Being more effective than previous Greening: - Definition of specific and measurable targets needed how Eco-schemes contribute to the protection of soil, climate and biodiversity; linking Eco-schemes to European Green Deal targets - Avoiding windfall gains - Achieving a change of agricultural practices on a considerable share of agricultural land (not only 5%)

What key factors and considerations should be made in ensuring the Eco-schemes are attractive (for MSs and farmers), effective, cost-efficient (in relation to the spent budget) and synergistic with AECM and other instruments? *(Please remember that measures should fit to an annual scheme and applying for an Eco-scheme is voluntary for farmers)*

a) In their design (e.g. how AECM or Eco-schemes should be designed/improved):

EU level	Your Member State (/region)
I think that Eco-schemes are attractive when farmers could give an “added value” to the product. And it usually happens in non-flat areas, where commercial agriculture is not viable (e.g. valleys or mountains). The challenge is to increase the Eco-schemes in flat areas where commercial farming is very profitable. And that could be done, in my opinion, by reducing the payments per hectare and to increase the payments in the Eco-schemes.	-
In general: definition of effective minimum protection through conditionality and national minimum standards, requirement that AECMs and Eco-schemes are only paid if they significantly exceed the minimum protection	Discussion about: Application of AECM/Eco Schemes for the largest agri-based GHG sources and AECM for biodiversity hotspots. Pro: For example, in peatland-rich MS/regions with intensive agriculture on drained peatlands, this is usually the largest sectoral GHG source -> Targeted AECM (and Eco-schemes) must be applied here addressing raising / high water levels Con: Temporary programs only partly match the need in peatlands for permanent rewetting.

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	Your Member State (/region)
- Avoid any GIS-calculations for the reporting - Devise clear rules how to calculate the income component, if applicable	- Knowledge transfer science-society should be fostered to explain farmers how their practices impact on the environment.

Specific questions:

Q2.1: What should be defined as minimum requirements for Eco-schemes to contribute to the success of the Green Architecture as a whole?

- At least 40 % budget payments, for both, Eco-scheme within 1st pillar - At least 10 % dark green measures in intensive agricultural landscapes and 20 % dark green measures in average of a whole country should be achieved (both >10% / 20% in arable land and >10% / 20% in grassland) - No application of pesticides in all Esc in the whole year (till 31/12/), - reduced fertilisation, - no-agricultural / energetic -use-time-intervals (e.g. 01.may – 30. June) in Esc - whole year measure for Esc (no tillage till 31/12)
- In general, Eco-schemes should go significantly beyond the minimum standards of conditionality and national standards

Q2.2: What are the pros and cons of a closed list-based approach (menu of options)?

Pros	Cons
- Have a clear list/menu of options for farmers.	- Not including food innovations that could be implemented in the following years. - The list should prioritize some of them, the ones impacting the most. Not all the practices have the same impact (quantitative and qualitative).
- Selected measures are somehow effective	- Regionalization of measures not possible, farmers can pick different options which might not be best options for regional biodiversity goals and landscape connectivity and composition
	- To limit excessive income effects the measure must be associated with a max. payment levels => will be insufficient in the most

	intensive regions and much too high in low input regions - Hardly targeted to the specific national problems
Consistency within the EU, fewer "loopholes" for MS	Hindrance of measures targeted to national challenges/needs and of "policy innovation" at national/regional level.

Q2.3: If the EU and MSs choose on a menu option, what would you list as examples that should or should not be included? *(Please remember that measures should fit to an annual scheme and applying to an Eco-scheme is voluntary for farmers)*

Examples of concrete, potentially-effective/cost-efficient Eco-scheme options that should be included:

At EU level	In your MS / region	Why?
- Maintenance of extensive livestock management systems	Same	To preserve pastures, reduce the risks (food safety), increase the resilience of animal-based products production...
-	Arable weeds in annual crops (wide sowing, shallow soils, neighborhood of species rich grasslands)	Effective measure to enhance floral diversity and plant-pollinator interactions
	Removal of top soil for ground nesting bees <i>(this is a very side specific and therefore probably not useful as an Eco-scheme. It could be used as a top-up elsewhere)</i>	Additional nesting sites for bees, ideally in neighborhood to resource rich habitats
	- Fallow arable on at least 10 % of the arable land of the farm, or at least [x] ha	- fallow for the period 01.01.-31.12. (optimally: start payments from year 2, with a bonus for continuation) - no fertilisation - no pesticide use
	- Landscape elements and buffer strips (together with fallow land – see above – on at least 10 %) on of the arable land	- minimum period 01.01.-31.12.
	- Transition to extensive grazing	- specific support for reducing grazing intensity below current levels, restoring landscape features, and/or conversion of a

		fallow land into permanent grassland
	Extensive permanent grassland management on at least [20 %] of the grassland or [x ha] (either under extensive grazing or extensive/partial mowing)	- no pesticide use - no cut or grazing for 3 months in the main vegetation season (15.03-15.08.) (3 months can be chosen in each MS or in each region of a MS) - no artificial fertilisation Minimum XX % grazing refuges [e.g. 20%] or/and structures are on the pastures and throughout the year
	Any measures that lead to a reduction of inputs, increasing heterogeneity of land uses, preserving low-input uses, limit external effects of agriculture. (The key question is less the measure but the attributed payment level)	Key problems in Germany very high intensity esp. in arable farming; Low input grazing systems are on the verge of economic sustainability
-	Focus Peat- and Wetland: <i>The needs of peat- & wetland were discussed in the group. Considering the administrative background AECM and Eco-schemes only partly suit here. Better would be climate funds and non-productive investments (funds should have different focus; otherwise legal problems of double funding). Nevertheless, we would like to briefly present the points of content</i> Promotion of maintaining high-water levels on peatlands and of paludiculture (wet use of peatlands) as additional payment per ha.	<i>The needs of peat- & wetland were discussed in the group. Considering the administrative background AECM and Eco-schemes only partly suit here. Better would be climate funds and non-productive investments (funds should have different focus; otherwise legal problems of double funding). Nevertheless, we would like to briefly present the points of content</i> Seven percent of the agricultural area in Germany is organic soil (usually drained peatlands), and this area is responsible for 37% of GHG emissions from agriculture and agricultural land use (46.8 million tonnes of CO₂ eq., approx. 25-40 tonnes per hectare per year). Complete abandonment of use, however, is not a sensible goal -> support for transformation to wet use is necessary.

Examples of concrete, ineffective or problematic or cost-inefficient options that should not be included:

At EU level	In your MS / region	Why?
- Precision farming		- Feasible only if it leads to reduced use of resources; However, precision farming might “just” lead to a higher effectiveness; for biodiversity we need however more areas with lower input levels (esp. in arable farming) At the moment still mostly very large-scale machinery ==> larger fields, less heterogeneity in the landscape Not sensible to promote just genuine farmer and on a per ha base - In most cases precision farming has nothing to do with biodiversity and can even worsen the shift to monocultures. It has a high chance of diluting Eco-schemes. This measure can be supported under “investments”, there is no need for Eco-schemes to do this.
-	-Reducing soil nutrient level	- Some measures have to be carried out before the farmer's agricultural application has informed the administration of their implementation (e.g. towing and rolling). This makes the measure uncontrollable for the administration and deadweight effects are very likely. Also measures that require controlling of biological or physical processes with a significant time-delay

	Abandonment of herbicides	(see explanation for soil nutrient level)
	Nutrient management options	First, to achieve a reasonable impact, in most cases the nutrient input must be reduced for a couple of years, as the soil can buffer annually changes to some degree in particular in relation to phosphorous and potassium. However, the farmer can opt in and out on a yearly base. Second, given the current (German) data-infrastructure for nutrient data, on-the-spot checks are necessary, inducing high administrative costs. Third, these checks cannot focus on differences in vegetation biomass and composition as these would hardly be affected by a one year change in fertilization, so chemical analysis are needed, increasing the control costs even further
Catch crops and green cover		This type is only partially on the parcel Evidence of its contribution to aboveground biodiversity is poor. It might even be contra-productive (e.g. by enhancing ploughing the stubbles) While having some important agronomic benefits (e.g. improving soil structure and fertility, preventing nutrient loss and soil erosion), this measure should be implemented through Expanded Conditionality Primarily serving for intensive production (by saving nutrients and preventing the surplus at the end of the culture to disappear in the groundwater), this measure is implemented by farmers anyway and hence, if supported through Eco-

		schemes, may result in payments with no added value (i.e. improving conditions and going beyond required GAEC)
Nitrogen-fixing crops		Mostly Nitrogen-fixing crops are grown as monoculture (e.g. beans and soy beans, Lucerne, clover-grass-mix) and they don't contribute substantially to biodiversity (except in best case small structured clover and Lucerne fields) nor do they contribute to water protection; however, to a small extent (e.g. 5 % of small seed legumes like Lucerne and clover could be integrated in an extensive farmland scheme, see above) Production of grain legumes is a production-oriented measure (to support EU protein crops) and could be supported under other tools, inter alia Expanded Conditionality Incorporation of nitrogen-fixing crops into crop rotations and mixed crops is supported under the organic scheme
	Fallow land, landscape elements and flower strips to only 5 %	Enhancing the extent of these elements from e.g. 3-5 % in the conditionality rules to 5-7 % is insufficient as it does not lead to actual restoration of such elements, and in some cases even allows habitat loss if thresholds are lower than current conditions. A requirement at MS levels should set target levels at 10-15% or higher depending on conditions
	Intense organic farming	Under some conditions organic farming is as intensive as conventional farming (e.g. in case of grasslands, 4-5 cuts on

		100 % of the grassland) ? therefore additional conditions are required for eligibility (see above: e.g. at least [20 %] of grassland should be under extensive management)
Forestry		Forestry operations, also under the title of “afforestation” should not be funded if they do not follow ecological principles of natural forest management and restoration.

Critical evaluation of the Eco-scheme flagships

Agroforestry: The establishment of an agroforestry system is linked to significant investment costs. The potential positive effects (economic and environmental) will occur only after a significant time delay. Given the 5-year period of the next CAP, it is hard to imagine that farmers will establish new agroforestry systems on the basis of Eco-schemes. Only if the sum of the annual payments exceeds the investment cost will farmers opt for this option. This means the costs must be capitalised within 5 years or less resulting in extremely high payments per hectare. The non-productive investments measure in Pillar 2 is much better suited to achieve this goal. In addition, the maintenance of these newly created features is not ensured after 2027. Lastly, agroforestry could also have negative environmental effects, especially for species linked to open areas (as steppe and meadow birds) or for the conservation of organic soils. Therefore an application procedure as in Pillar 2 seems advisable. Eco-scheme could help to preserve existing agroforestry systems and improve their quality.

Agro-ecology: the Commission describes agro-ecology as a holistic approach requiring knowledge, investments and management. Enhanced crop rotation is suggested as an agro-ecological practice that might be funded under this heading. However, real crop rotation would require that the national authorities should track the management of individual fields for multiple years irrespective of the farmer that is managing them. It would require creation of an information system for farmers informing them on the management of the respective areas in recent years. As short-term lease contracts for arable land are not unusual, farmers would need access to such an information system to have the information which crops would be allowed each year. Establishment of landscape features such as hedgerows is also suggested under this heading, but similar arguments can be made here as against agroforestry. Another example is nutrient management. If the goal is to reduce the nutrient level for a specific area, the restriction should be required continuously. Especially in the case of mineral phosphorous or potassium there is generally no environmental benefit in waiving

their application for a limited number of years (1-3) and then fertilising the soil “buffer” in the years in between. Consequently, this goal could be only achieved with classical AECM in Pillar 2 or with Eco-schemes mimicking these AECMs (i.e. multi-annual contracts). Principally the flagship option agro-ecology includes the most options that make sense from a scientific perspective.

Precision farming: the objection here to the Commission’s ideas are somewhat different to those made previously. Frequently, the costs of the technology needed for precision farming do not scale in line with the farmed area (the implementation of precision farming is frequently a binary decision). This means that, if payment is linked to the farmed area, there will be tremendous overcompensation of larger farms that employ the technology anyway because of its labour-saving effects and greater efficiency, or else the support would not be sufficient to foster implementation in small and medium-sized farms. In addition, some technologies, like for example improved fertiliser application, are not size neutral. Managers of smaller farms frequently know their plots well enough. The variation of the site characteristics within their generally small plots is so small that precision farming provides hardly any ecological and economic benefit compared to an appropriate management based on average conditions per plot. It would seem more sensible to support precision farming under Pillar 2 AECMs as (1) investments can be directly supported, (2) the support can be referenced to more sensible units (e.g., m³ of slurry spread with an efficient technology instead of just applied ha) and (3) targeted to other suitable beneficiaries (e.g. machine rings or contractors). All these levers can strongly increase the efficiency of the support measure.

Carbon farming: for many actions undertaken by farmers or land managers that help to lock up carbon either in biomass or the soil (conservation agriculture, cover crops, afforestation, rewetting, conversion to grassland, etc), the efficacy of annual payments can be questioned. The same arguments apply to afforestation as applied to agroforestry discussed above. In the case of the rewetting of organic soils, there is no benefit if the water level is elevated for just one year. Also, rewetting requires in most cases planning, consultation and investment, all of which sounds remarkably like the toolbox provided by Pillar 2. The conversion of arable land to grassland also only makes sense if the plot stays grassland for several years (the soil carbon kinetics follow the principle of ‘slow in fast out’), thus requiring a long-term commitment to have an effect. Finally, the effects of conservation agriculture at least in the humid zone of west-central Europe on GHG mitigation can be very mixed, therefore requiring a careful delineation of eligible areas. This all suggests that carbon farming is not a first-choice option for Eco-schemes and that Pillar 2 instruments such as non-productive investments and longer-term management contracts will be more appropriate.

Q2.4: What are the pros and cons of a top-up payment versus income foregone? What would you recommend and why?

Pros	Cons
Better / important incentive	Possibility: Green-Washing
Payment levels could better reflect ecological effectiveness of the measure	
Top-up: Innovation-friendly in new agricultural practices which are currently more expensive than conventional ones due to their specificity/low economies of scale (e.g. wet peatland use-> new technology required). Incentives for the provision of ecosystem services: Nature conservation and climate protection as business segments of agricultural enterprises Cost efficiency can be ensured e.g. by point or rating systems	

Q2.5: How should Eco-schemes best be organized spatially, among themselves and with respect to AECM? Please consider: How can this be promoted by the EU and administrated by MSs? How to balance cost-efficiency of the measure (focus on hot spot) vs. Broad scale application?

- The spatial organization should be supported by the delimitation of areas where the support for specific measures is feasible;
- The coordination is site level could be fostered by RDP-measure (e.g. consultancy / AKIS) and supported by top-ups

Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)

S.M.A.R.T.: “Specific, Measurable, Ambitious/attainable, Realistic, Time bound”

Note: The Biodiversity strategy requires a) 10% landscape features, b) expansion of organic farming to 25% UAA and c) reduction in pesticide (impacts) by 50%.

What key factors and considerations should be made by MSs when setting targets in their CAP strategic plans, and how should the EU guide and assess them?

EU level	Your Member State (/region)
- Naming of the key species and key habitats should be required and the calculation of target populations as well as target areas (quantitative + qualitative) should be required	- Key species and key habitats should be named and the calculation of target populations as well as target areas (quantitative + qualitative) should be provided
- clear delimitation of reference area (agricultural area) - clear definition of accountable elements - on which levels should the goals be achieved (treating all areas equally?) - Define Indicator that considers all relevant levels of the Green architecture (conditionality, Eco-schemes, RDP)	- Regional differentiation and specialisation with respect to the contribution to the target
Focus Peat- and Wetlands: - Not to forget the link to the European Green Deal and the proposed European climate protection law - Agriculture and land use sectors must contribute to achieving net zero greenhouse gas emissions by 2050; and a reduction of 50/60% by 2030 compared to levels in 1990: e.g. cutting emissions from drained peatlands by increasing share of rewetted peatlands - EU may ask for a transformation pathway how to address the long-term climate goals and when to meet mid-term goals - Success is measurable via data from annual national greenhouse gas inventories compiled for reporting under UNFCCC	Focus Peat- and Wetlands: - Starting points should always be the most relevant aspects identified in the SWOT analyses. See Germany: Emissions from peat soils → Need for action. Specific measures must be taken to address this.

Specific questions:**Q3.1: What could count as “ambitious” targets? (how do you measure ambition?)**

- Naming and quantification of target populations and areas of target species should calculate a 20% of the populations within 5-7 years

Q3.2: How should baselines be defined? (e.g. in terms of year, UAA/habitat cover etc.)

- The baseline could be related to the scientific evidence. For example, minimum species of crops per surface unit. Minimum SOC content according to the specific texture and other edaphic conditions. In summary, to establish minimum limits (baselines) according to the current scientific evidence.
- Also, population sizes or population densities could form a baseline for measuring target achievement (e.g. target + 30 % within 5 years).

Q3.3: What should/could be done so that MSs would be ambitious in setting, measuring and meeting the targets?

- To establish common methodologies within the EU to have a common framework for all the MSs and to be able to compare the values.
- To consider the specific landscape current situation and prioritizing flat areas where commercial monocrops have “colonized” the landscape, to apply high minimum standards in those areas, whereas in areas where small farmers are more common the objective should be more to preserve the *status quo*.
- The higher the realized ambition level; the higher is the allowance to use income supporting / easy to administer instruments
- The more ambitious the program structure is, the more flexibility w.r.t to reporting
- Communicating clear standards for National Strategic Plans
- Close cooperation with science, scientific findings as “baseline” for a closed list of measures.
- Ask member states to involve science, NGOs, the public in time for designing National Strategic plans

Q3.4: What should MSs do to ensure that their targets translate into actions by farmers?

Recall that AECM and Eco-schemes are both voluntary. If they are not attractive, farmers will not take them up and, consequently, MSs may not be able to meet the targets.

Please try to provide concrete, feasible examples

- Depends on measures → key factors are financial attractive measures, administrative easy measures (fulfilment of requirements) and good accompaniment
- Monitor the implementation levels; if implementation is insufficient adjust the payment levels

Focus Peat- and Wetlands:

- Coherence between the different elements of the CAP needed. Example peatland protection:
 - (1) Wet use of peatlands must be made eligible for direct payments (recent decisions in EP and council are promising),
 - (2) provide advice and investment support for wet use (paludiculture),

- (3) no 2nd pillar funding/measures for drained peatlands that does not address high water levels or are combined with such a measure (can be implemented via LPIS layer of organic soils),
- (4) farming on drained organic soils must lose eligibility for direct payments (step by step, phase out) (use GAEC 2 for clearly communicating increasing ambitions to farmers; align/tighten national regulatory law),
- (5) support Just Transition of peatland rich regions by CAP + other EU and national funds

Q4: How can science improve the way indicators are used for performance evaluation of the CAP?

Q4.1 How can landscape features be best mapped? (Impact indicator to be used in the next CAP. Needs to be up to date, detailed)? It is feasible in your country?

Indicator	Justification	For which MSs?
- Diversity of crops within one farm	- Increase wild biodiversity and food self-sufficiency, among other ecosystem services	- Especially for those with flat and homogeneous geomorphology
- NDVI	- Helps to estimate the abundance of vegetation and to distinguish between different types of vegetation.	- All
- HNV farmland indicator	- (what does that mean in this context?)	- Germany / all

Q4.2 How can the methods for biodiversity indicators be improved, for the habitats and species of the Habitats Directive? (Impact indicator to be used in the next CAP). It is feasible in your country?

Indicator	Justification	For which MSs?
- The previous ones. For the diversity of plant species.		
- For the diversity of animal species, I think that indirect indicators would be the most efficient	Animal species are related to some habitats and plant species and, therefore, by estimating the diversity of plant species	All
Different levels of indicators - Landscape heterogeneity (composition, configuration, temporal shifts e.g. crop rotation)		
- Biodiversity indicators based on noninvasive methods or standard methods		

Q4.3 What are the best biodiversity indicators that can be proposed for the Complementary Result Indicator (FA 4A)?

“Restoring, preserving and enhancing biodiversity, including in NATURA 2000 areas, and in areas facing natural or other specific constraints, and high nature value farming, as well as the state of European landscapes”. See also here: https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/complementary-result-indicators-pillar-ii_en.pdf

Note: such indicators should be feasible to collect and analyse in multiple MSs, they have a running monitoring system, and can clearly interlink CAP measures and biodiversity.

Indicator	Justification	For all MS?
Taxonomic indicators: Butterflies, birds, possibly pollinators, and flowering plants where there are established monitoring schemes available.	Butterfly Monitoring Schemes (BMS) and bird monitoring schemes cover a large number of countries. Standards for plants exist for many years. For pollinators there are evolving schemes and good protocols.	All (birds), 22 MSs (butterflies) and many others for plants and pollinators
A possible formulation of an indicator can be: “Increase in the abundance and richness of indicator species (e.g. butterflies, flowering plants and/or other monitored species under the Habitats Directives’ Article 17) in farmland areas under CAP, including NATURA 2000 sites and their vicinity, in permanent grasslands and in high nature value farmlands”. OR: “An increase in butterflies/pollinators’/ abundance and the richness of grassland indicator species”.		

Landscape-level indicators: HNV farmland	While the HNV Impact indicator was taken out, this was not really justified: from a scientific perspective, it is possible to streamline the method across MSs for the landscape level.	All
For a landscape-level indicator, a possible formulation can be: “An increase in extent and improvement in quality of habitats in farmland areas under the CAP (especially under AEEM, Eco-schemes and Areas of Nature Constraints) including High Nature Value farmland, permanent grasslands, as defined by prevalence of landscape features, extent of well-managed grasslands, use of pesticides and herbicides (composite indicator)”		

At landscape level: formulate High Nature Value farmland (if information is available and mapped)

It is proposed to give Member States several options to select from, but require MSs to select at least one taxonomic indicator and at least one landscape-level indicator.

How?

Using data from farmland, near farmland, or surrounded by high proportion of farmland area under CAP.

Reply Ireland

Workshop facilitators: Yvonne Buckley (Trinity College Dublin), John Finn (Teagasc), Alan Matthews (Trinity College Dublin), James Moran (Galway-Mayo Institute of Technology), Jane Stout (Trinity College Dublin)

Contributors: Craig Bullock (University College Dublin), Dolores Byrne (Institute of Technology Sligo), Oonagh Duggan (Birdwatch Ireland), Brendan Dunford (Burren LIFE), Patrick McGurn (AranLIFE), Fergal Monaghan (Hen Harrier Project), Daire O'hUallachain (Teagasc)

Workshop date: 28.11.2020

Introduction

The following workshop report follows the template prepared by the coordinating group for this project consisting of the German Centre for Integrative Biodiversity Research (iDiv), UFZ – Helmholtz Centre for Environmental Research, the Thünen Institute Federal Research Institute for. Rural Areas, Forestry and Fisheries, and the Universität Rostock (following a request for such workshops from the European Commission).

This workshop report provides input from an *ad hoc* expert group in Ireland brought together by the [CAP4Nature network](#) seeking to provide advice, based on relevant scientific research, on how EU Member States in general, and Ireland in particular, could best make use of the proposed 'Green Architecture' in the new CAP framework to achieve Union and national biodiversity targets. It also draws on work undertaken by the Technical Group of the [Farming for Nature](#) project, an independent, not-for-profit initiative which aims to support High Nature Value farming in Ireland that was established in 2018.

Ireland is among the 194 signatories to the Convention on Biological Diversity (CBD) that adopted a set of aims called the Aichi Targets ten years ago with a deadline of achieving them by 2020. National policy is set out in Ireland's third [National Biodiversity Action Plan](#) for the period 2017-2021 which was launched in 2017. This sets out Ireland's Vision for Biodiversity as: "That biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally." One of the seven priority actions in the Plan is ensuring conservation of biodiversity in the wider countryside, while another is expanding and improving on the management of protected areas and protected species.

An [interim review of the implementation of the National Action Plan](#) was published in February 2020. This underlined that the status quo is not currently delivering meaningful

results for biodiversity at scale throughout the wider countryside. Key biodiversity indicators continue to decline. The National Biodiversity Data Centre maintains a [biodiversity indicator database](#) which has informed its latest report [National Biodiversity Indicators: 2017 Status and Trends](#). More recently, the Irish Environmental Protection Agency report [2020 Ireland's Environment: An Integrated Assessment](#) includes a chapter assessing the status of nature, and concluded: “The challenges involved in protecting Ireland’s habitats and species are now more serious than ever and need urgent action”. With the exception of the Countryside Birds Survey which, as its name implies, has a focus on birds, there is no systematic, regular, monitoring programme to assess the conservation status of habitats and species in the wider countryside (outside of protected areas), even though this is one of the seven priority areas in the national action plan.

Under the EU Habitats Directive, Member States are required to monitor habitats and species considered to be threatened. The conservation status of listed priority habitats and species is assessed at a national level, not just in protected areas. The [third report on the status of habitats and species in Ireland](#), prepared by the National Parks and Wildlife Service in 2019, stated that most of Ireland’s listed priority habitats can be classified as having an unfavourable status. According to the [interim review of the National Action Plan](#), in Ireland, 85% of EU protected habitats are reported as being in Unfavourable status with 46% demonstrating ongoing declines. The main drivers of this decline are agricultural practices which are negatively impacting over 70% of habitats, particularly ecologically unsuitable grazing, abandonment and pollution. Of particular note are declines in peatlands and grasslands, and some of the marine habitats. One-third of our bee species are threatened with extinction in Ireland. Although 30 per cent of the populations of Ireland’s breeding bird species are stable or have increased, a fifth are in long-term decline. The overall picture for priority plant and animal species (listed in Article 17 report) is substantially better, with over 70% stable or increasing.

The Prioritised Action Framework (PAF) is a strategic multiannual planning tool, aimed at providing a comprehensive overview of the prioritised measures that are needed to manage the EU-wide Natura 2000 network (which comprises Special Areas of Conservation and Special Protection Areas) and its associated green infrastructure. The [Draft Prioritised Action Framework \(PAF\) for Natura 2000 in Ireland 2021-2027](#) identifies the financing needs for these measures for the period 2021 – 2027. Examples of the priority biodiversity objectives include: management of freshwater systems, conservation of the freshwater pearl mussel, management of uplands, conservation of birds in serious decline (eg corncrake, breeding waders, partridge, barn owl etc.), protection and restoration of bogs and other wetlands, management of species-rich grasslands.

Q1: How can the different Green-Architecture elements optimally complement each other?

What key factors and considerations should be made in ensuring the Green Architecture operates best?

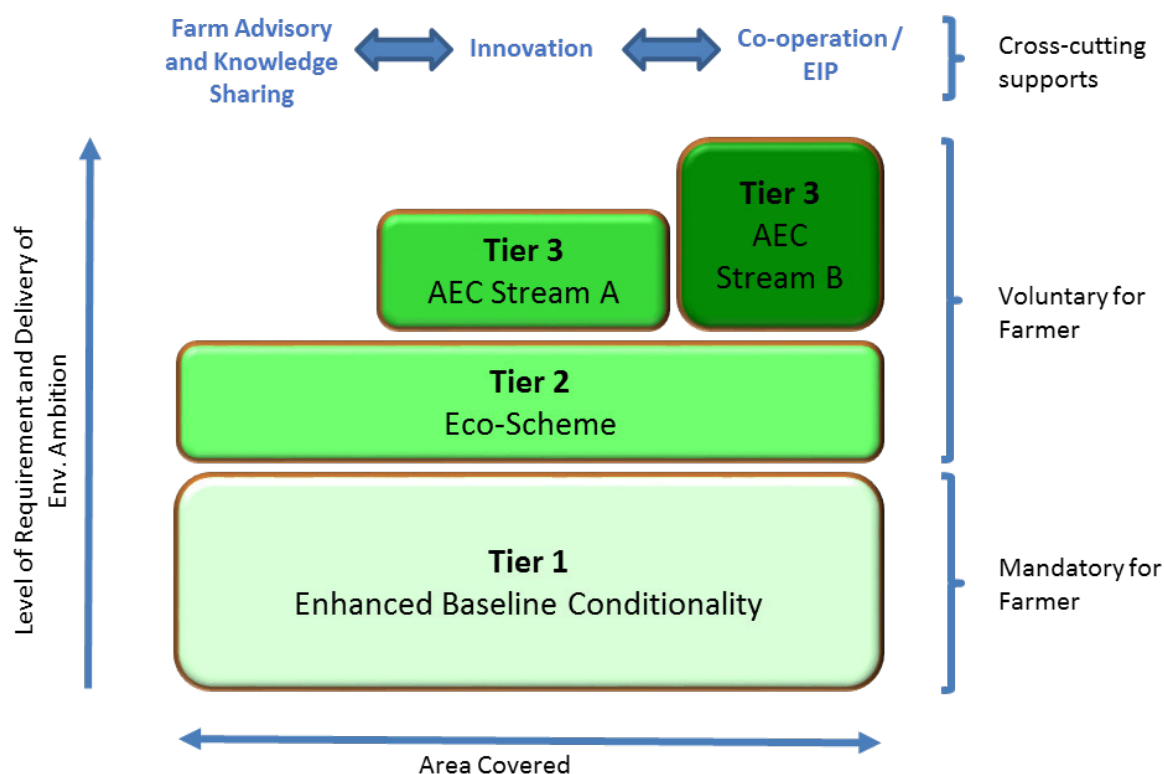
General comments

There must be integration and coordination of measures, with a clear hierarchy of ambition and specificity across the entire Green Architecture, starting with eligibility rules through baseline conditions to Eco-schemes and agri-environment-climate measures (AECMs).

There is potential for a significant increase in budget for agri-environment measures when Eco-schemes and agri-environment measures are included. Projected spending in Pillar 2 in Ireland plus 20% of Pillar 1 envelope devoted to Eco-schemes would give a combined budget of approximately €500 million per annum that has the potential to deliver on biodiversity targets.

The Farming for Nature Technical Group (FFNTG) proposals for Ireland's CAP Green Architecture were presented to the workshop participants (Fig. 1) (FFNTG 2020). This envisages an integrated framework across Pillars 1 and 2 of the CAP with three tiers with clear increased ambition from Tier 1 (baseline conditionality, assuming that GAEC 9 applies to all farmland, and not just arable farmland) to Tier 2 (Eco-schemes) to Tier 3 (agri-environment-climate measures), supported or complemented by other CAP measures such as redesigned ANC payments with a much clearer focus on environmental outcomes, farm advisory services/wider Agricultural Knowledge and Innovation Systems (AKIS), EIP operational groups and the cooperation measure, non-productive investments, payments related to Natura 2000 and Water Framework Directive and technical assistance. Eco-schemes should be points based rewarding achievement of specific environmental targets across all applicant farms (see Question 2 for more details) based on proportion of farm covered by eligible features complemented by a limited number of farm type/landscape specific actions. The FFNTG proposal includes an innovative approach to agri-environment schemes (Tier 3) with two streams. Stream A would be targeted at general measures across the whole country, while stream B would provide a mechanism for roll out of targeted locally adapted farming for nature measures, focused on hybrid result based payments schemes tried and tested in Burren and various EIP operational groups. The workshop participants saw merit in this overall framework.

Fig. 1.: Proposed CAP Green Architecture for Ireland from Farming for Nature Technical Group demonstrating the hierarchy of ambition and specificity needed to deliver meaningful outcomes for biodiversity

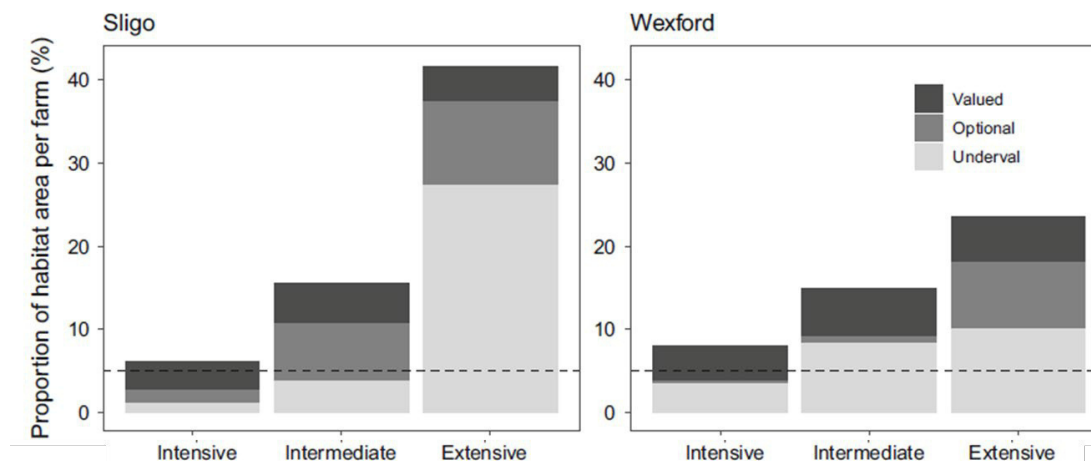


Source: FFNTG 2020

Land eligibility rules need to be amended so there is a clear value put on agricultural land that contributes to delivery of the CAP objectives including those on environment and climate. Currently some land that contributes most to biodiversity and climate is undervalued or not eligible for support (Rotchés-Ribalta et al., 2020; Larkin et al., 2019) and as a result is threatened with land use change (Rotchés-Ribalta et al., 2020). The workshop noted that amendments to the draft CAP Strategic Plans Regulation have been made by both the Council and Parliament that would extend the concept of eligible hectares to include non-productive features, but it would still be up to Member States to define these features in their Strategic Plans.

Schemes for boosting competitiveness included in European Parliament Amendment 238 (Article 28a) have the potential both to weaken the CAP Green Architecture and to divert budget away from environmental objectives of CAP.

Fig. 2.: Proportion of semi-natural habitat area in relation to the classification of policy protection in Ireland i.e. *valued*, protected under national and EU Agricultural Policy; *optional* habitats are eligible under Basic Payment Scheme. Farmers are not obliged to retain them, but can be incentivised to do so under voluntary schemes including Agri-environment Schemes (AES) or EFAs and; *undervalued* habitats not fully protected and farmers are not, in general, obliged to retain them, and those habitats are currently ineligible for agri-environment schemes. Dashed line indicates the 5% value



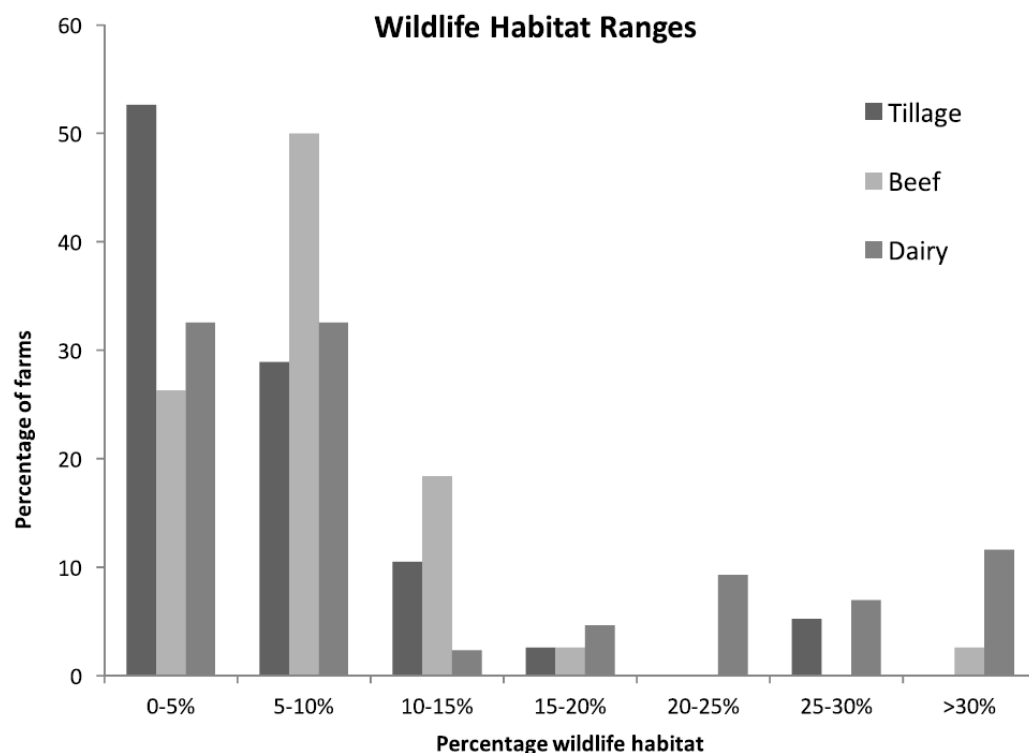
Specific questions:

Q1.1: What are the key components to maximising synergy among instruments?

- Coherence in eligibility rules across the Green Architecture is critical and retention of landscape features or other semi-natural vegetation that can provide a valuable contribution to meeting biodiversity, climate and water targets should be encouraged through CAP eligibility rules for direct payments. Currently, important semi-natural features for the delivery of a range of ecosystem services on farmland are considered ineligible. Landscape features and other eligible areas under enhanced conditionality (GAEC 9) and Eco-scheme should be taken into account when defining overall eligibility rules to ensure consistency across the Green Architecture.
- Restricting requirements for GAEC 9 to arable land will not enhance baseline conditionality in the Irish context due to the relatively small area of arable land. It will also create very significant coherence problems in designing Eco-schemes and AECMs under the no-double-funding rule. To ensure there is a minimum level of green infrastructure across all farms, as in the Commission's draft proposal, GAEC 9 should be extended to all farms including grassland farms. The majority of Irish farms have more than 5% semi-natural features with no fertiliser or pesticide application and many surveys in the wider countryside show farm habitat areas of 10-14% (from samples in farm surveys in Sheridan et al. 2013, 2017; Sullivan et al., 2011; Rotchés-Ribalta et al., 2020) (Fig. 2), though with a lot of variation. Research on intensive farms showed a median farm habitat area of 5% for tillage, 6% for intensive beef and 6.55% for intensive dairy (Fig. 3,

from Larkin et al. 2019). Based on these results, the minimum share of land devoted to these features under baseline conditionality should be at least 5%.

Fig. 3: Distribution of wildlife habitat area (% of total farm area) across surveys conducted on tillage, intensive beef and intensive dairy systems in Ireland.



Source: Larkin et al- (2019).

- There should be additional incentives for farms that exceed this baseline through Eco-schemes and agri-environment climate measures to both increase the quantity and quality for provision of a range of ecosystem services from these areas. This would be difficult to design if some farms (arable farms only) are required to maintain a share of non-productive land as a GAEC standard and other farms are paid for this under Eco-schemes.
- Through a combination of baseline conditionality and Eco-schemes, targets should be set across Irish farms to attain a minimum threshold of 10% semi-natural vegetation and landscape features where fertiliser and pesticides are not used. Eligible areas to meet this 10% should extend to extensively grazed semi-natural grasslands because excluding these areas of value for biodiversity could potentially reduce their protection and increase their risk of degradation through either intensification or abandonment.
- The area of landscape features and the quantity of semi-natural vegetation on farms can be used as the basis for a points-based Eco-scheme.

- Where minimum points are not achieved on a farm then a simple list of additional evidence-based actions per farm would be available e.g. native tree planting, hedgerow planting, riparian buffer strips. This would expand semi-natural vegetation and landscape features to a minimum percentage on all farms. Provision would need to be made for sufficient lead in time for farms to meet criteria where minimum areas do not already exist on farms.
- Agri-environment schemes (AECMs) should have a focus on improving the ecological quality (and not just quantity) of the Green Architecture.

Q1.2: what are the barriers, caveats to consider?

- Barriers include insufficient ambition; excessive weighting and conversion factors; lack of appropriate advisory support.
- Some other instruments counteracting the effects of the Green Architecture e.g. farm investments for modernisation; Forestry. There needs to be more coherence across the policy instruments.
- Eligibility rules for Pillar 1 have consequences for what is paid for in Pillar 2. This can be resolved with coherent eligibility rules. There is a need to ensure that there is no risk of double payment across the Green Architecture. This may be best achieved by ensuring there is a hierarchy and greater levels of ambition as you move up the tiers in the Green Architecture. The importance of extending GAEC 9 to all farms has already been emphasised.
- Considerable evidence indicates that the list of landscape features should be expanded from the current list. This would have a high biodiversity dividend, and would greatly assist farms to attain and exceed the 5% and 10% habitat area thresholds (Larkin et al., 2019; Rotchés-Ribalta et al. 2020). The FARMECOS (Farming And natural Resources: Measures for ECOlogical Sustainability) project funded by DAFM has a provisional list (unpublished) of eligible features. This includes semi-natural grasslands, heathland, peatland, native woodlands/scrub, wetlands, buffer strips, field margins (no chemical inputs), hedgerows/treelines, drainage ditches on mineral soils, and associated margin, and ponds.
- There is the potential for Member States to lose money if Eco-schemes are not taken up in Pillar 1 or requirements are not met at farm level and unused funds need to be returned to Brussels. It is accepted that it will need a considerable amount of information upfront to operate Eco-schemes on a points basis, so this will require early planning for success. To avoid perverse incentives, Member States should be assured that unused funds in any year can be retained, for example, by making use of flexibility arrangements to transfer them for use in agri-environment-climate schemes in Pillar 2.
- It is difficult to accurately map the quantity and quality of semi-natural grassland and this information is absent from current CORINE land cover classification. There is wide variation in the broad type of Irish pastures, which range in type from extensive upland heathland to intensive lowland grassland pasture, with corresponding wide variation in biodiversity values. Current national land cover and habitat maps are being developed by the Environmental Protection Agency and due for release in 2021 which will make semi-natural vegetation/feature mapping feasible across all farms at little additional cost, dependent on the integration of the new land cover map into Land Parcel

Identification System (LPIS). Ideally, land parcels should be defined to make them as ecologically homogeneous as possible to underpin results-based measures, although this would have the downside of increasing the number of parcels on some farms. It seems that a pilot Farmland Environment Survey is being considered for implementation by DAFM in 2021. This sounds promising, but none of the participants had any further detail on this, or the extent to which it might resolve some of the mapping issues.

- From a logistical perspective, there may be difficulties in implementing and reconciling seasonal farming actions and seasonal administrative deadlines within a single year. In the context of an annual scheme with BPS applications in April/ May and payments in October there will only be 6 months to deliver additional actions. For example, planting hedges or native trees is not typical in the April – October period. Farmers need a choice of actions that build up environmental assets and can be delivered rapidly (Wild Bird cover strips, grass margins/ buffer strips on slopes and riparian zones along with more permanent actions (tree planting/ hedges).
- The preparation for implementation of these more ambitious goals will require substantial inputs of information, and knowledge, which will require time. The transition period before the new CAP enters into force needs to be utilised effectively to overcome this potential barrier.

Q1.3: Are there (additional) instruments that should be considered for the Green Architecture?

- Cross cutting supports such as AKIS and farm advisory services, non-productive investments, co-operation and innovation support (European Innovation Partnership Operational Groups) need to be integrated into the CAP Green Architecture.
- Ireland has extensive experience with farm sustainability audits (Bord Bia Quality Assurance and Sustainability Schemes, and Origin Green). There is potential for existing audits to be strengthened and integrated with Eco-schemes; for example, to increase the quality of the data collected, reduce administrative burden on farmers and reduce duplication of inspections and data capture for administration.
- With the integration of auditing schemes, there is potential for a simplified contract between the administration and the farmer encompassing the range of environmental commitments and services provided by the farmer. The ideal to work towards is that farmers would have a single agricultural-environmental-climate (AEC) contract that would include all commitments across the Green Architecture rather than having to enrol in multiple schemes. For example if a farmer has a stream B AEC contract which has highest level of ambition in the Technical Group proposal outlined above, it should also incorporate the baseline conditionality, Eco-scheme and other AEC commitments so that the farmer can see in one simple map-based contract that if he or she has fields/features with X score and undertakes X Y Z actions then he or she meets all the requirements. While this would be a massive simplification for the beneficiary, it would admittedly be a much more complex task for the administration.
- There is no need for coupled livestock payments to be used as a policy instrument to deliver biodiversity benefits as long as the overall Green Architecture connects payments to environmental performance. With the exception of payments for rare native breeds of livestock, payments coupled to production are a very crude instrument

which have had considerable negative consequences on environmental quality in Ireland in the past. Coupled payments relating to farm level stocking rates do not reflect the large variation in carrying capacity of different pastures on many farms. Well-designed results-based agri-environment payments have been proven to maintain livestock numbers while improving environmental performance in an Irish context (O'Rourke and Finn, 2020; AECOM, 2020). Payments should be linked to environmental outputs NOT to livestock numbers.

Q1.4: What should be defined as minimum requirements for (success of) the Green Architecture as a whole?

1. Needs to go above and beyond existing minimum requirements in terms of baseline conditionality and greening, as existing measures are not maintaining environmental quality in Irish countryside (see CAP4Nature 2019, EPA 2020, NPWS 2019).
2. Include the full range of semi-natural vegetation and habitats in the Green Architecture, including farmland habitats formerly considered ineligible (Rotchés-Ribalta et al., 2020).
3. Consider a threshold of 5% of farm area for space for nature (landscape features and habitats) as part of GAEC 9, and applied to all farmland, and not just arable land.
4. Consider a higher threshold of 10% of farm area for space for nature (landscape features and semi-natural habitats) as a focus of the Agro-ecology Eco-scheme that pays for habitat area >5% (applied to all farmland, and not just arable).
5. Use AECM actions to implement results-based payments to improve the ecological **quality** of farmland habitats, including those in GAEC 9 and the Eco-scheme. This will have the effect of better valuing and protecting existing habitats (that tend to have higher biodiversity value than newly created habitats), incentivising the improvement of degraded habitats, and maintaining those habitats with existing high ecological value. (e.g. O'Rourke and Finn, 2020; Ó hUallacháin et al., 2016; Finn et al., 2020; Rotchés-Ribalta et al., 2020).

It seems that a 'Results-based Pilot Agri-environment Scheme' is being considered for implementation by DAFM. This sounds promising, but none of the participants had any further detail on this.

6. Strongly consider incentives for the use of environmental bundles of mutually reinforcing measures to enhance effectiveness. For example, the effectiveness of installing a nesting box for raptors will be enhanced by also adopting rodenticide-free controls in farmyards, and in tandem with habitat measures that favour the prey of raptors. There are similar logical bundles of actions for various objectives that will enhance effectiveness (if they are aligned to good conservation practice in the first place).
7. "To conserve pollinators and help protect pollination services, our expert elicitation highlights the need to create a variety of interconnected, well-managed habitats that complement each other in the resources they offer. To achieve this the Common Agricultural Policy post-2020 should take a holistic view to implementation that integrates the different delivery vehicles aimed at protecting biodiversity (e.g. enhanced conditionality, eco-schemes and agri-environment and climate measures). To improve habitat quality we recommend an effective monitoring framework with target-orientated indicators and to facilitate the spatial targeting of options collaboration between land managers should be incentivised." (Cole et al. 2020).

Q2: What can be the role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?

Your inputs:

What key factors and considerations should be made in ensuring the Eco-schemes are attractive (for MSs and farmers), effective, and synergistic with AECM and other instruments?

As a general comment, we note that Eco-schemes have to be designed within the constraints of the rules for annual direct payments. This is far from ideal for many environmental and climate measures which require a longer-term commitment such as is possible with AECMs in Pillar 2. While Eco-schemes do have greater flexibility in the design of payment schemes, an important element in designing the CAP Strategic Plan will be to reflect on the merits of transferring some of the Pillar 1 funding allocated to Eco-schemes to Pillar 2 where they may be used more effectively from an environmental and climate perspective. This will become more attractive if the ring-fencing of Eco-schemes is modified to take into account particular efforts in AECMs in Pillar 2, as proposed in the Council position in the trilogues.

Nonetheless, we still feel Eco-schemes can have potential in an Irish context, for example, in paying farmers to create additional landscape features as suggested in answer to the previous question. Once GAEC 9 applies to all farms, such features once created would be protected for the duration of the Strategic Plan. Other examples of practices that would fit within an annual payments scheme include tillage farmers maintaining overwinter green stubble or cover crops, slurry injection rather than splash plate and wide buffer strips near watercourses for dairy farmers. Encouraging regenerative farming practices could also be incorporated, or knowledge transfer.

Comments on the four flagship Eco-schemes

The Eco-scheme proposal assumes that biodiversity is a joint product of many of the activities of these Eco-schemes. Care is needed in the design and implementation of Eco-schemes to ensure that this biodiversity benefit is realised. In addition, the biodiversity benefit of the Eco-schemes is expressed as 'Landscape features' in the Agroforestry and Agro-ecology flagships. Biodiversity is not mentioned as a target of the 'Precision farming' flagship. The 'Carbon farming' flagship is expected to contribute to "Biodiversity related targets, landscape features", and makes a distinction between 'biodiversity related targets' and 'landscape features'. This is the only mention of 'biodiversity related targets', and it would be important for the basis of this distinction to be clearly articulated.

The most directly relevant text for biodiversity is in the following four specific points in the Agro-ecology Eco-scheme:

- "4) Landscape Features, higher share of permanently devoted areas to landscape features and additional types of elements to be retained, beyond GAEC 9.
- 5) Land lying fallow with enhanced species composition dedicated for pollination, farmland birds or other target species.
- 6) Support for low to moderate grazing level in target areas.

7) Implementation of flower strips, margins strips and high diversity grassland strips dedicated to biodiversity.”

The definition and interpretation of the terms in point 4 of the Agro-ecology Eco-scheme will be crucial to ensuring the applicability of the agro-ecology flagship Eco-scheme to the range of farmland habitats that are not classed as Landscape Features. It is essential that point 4 and point 6 encompass wildlife habitats formerly considered ineligible, and that they encompass High Nature Value farmland. For effective biodiversity conservation, all farmed semi-natural vegetation should be valued as one progresses through the GAEC, Eco-schemes and AECM.

The majority of biodiversity on farmland occurs on farmland types that are not classed as ‘landscape features’ e.g. lowland species-rich grasslands, alpine species-rich grasslands, heathlands etc. These farmland types range from farmland habitats that are considered ineligible for CAP payments to high nature value farmland. It would be important to clarify whether the scope of the biodiversity actions and improvements is limited to farmland areas classed as ‘landscape features’.

There is no dedicated biodiversity flagship Eco-scheme, which might be a more appropriate option for directly incorporating biodiversity into Eco-schemes while also ensuring co-benefits for climate and water (as indicated by the strong overlap in HNV farmland and high water quality in Moran and Sullivan (2017)). This could be used to pay for additional landscape features not paid through GAEC. This might be especially relevant for High Nature Value farming systems that might be:

- a) reduced in nature value by agroforestry,
- b) already implementing agro-ecology practices and risk replacing existing more beneficial practice by a new practice that is nominated in Eco-schemes,
- c) not a relevant target for precision farming, or at least that envisaged by the flagship Eco-scheme, which seems to be very targeted toward improving the production efficiency of market products from agriculture. The principles of precision agriculture (ICT-based technologies) could be used to improve public good supply in High Nature Value farming systems (for example the [Pearl Mussel Project](#) and [Hen Harrier Project](#) (and others in Ireland)). These projects are developing sensing technologies, online tools and applications to improve the implementation, targeting, monitoring and rewarding of the supply of public goods and services (including biodiversity, climate regulation, air and water quality).

However, this specific scenario seems to be excluded in the ‘Precision farming’ flagship proposal. The provision of public goods and services should also be a legitimate a focus of technological support. In Ireland, the Irish Forum on Natural Capital www.naturalcapitalireland.com is developing systems and capacity for natural capital approaches on farmland.

A potential way forward for Eco-schemes in Ireland is a points-based system rewarding achievement of specific environmental targets across all applicant farms. This could be based on the proportion of farm covered by eligible features complemented by limited number of farm type/landscape specific actions where minimum points target to achieve payments are not achieved. Eligible areas should include all semi-natural vegetation features on farms (farmed and unfarmed). The proportion of semi-natural vegetation on farms is an important indicator of the overall nature value of farms in Ireland (Boyle et al 2015). Across Europe the proportion of semi-natural vegetation is important for the supply of a range of regulation and support ecosystem services such as pollination, pest control and water quality for example (García-Feced et al 2015).

The targets set for proportion of semi-natural vegetation in Eco-schemes will be dependent on standards set for baseline conditionality. However, if we want to align the CAP targets in MS with the

EU Biodiversity and Farm to Fork Strategies, then we should aim for the points target to be equivalent to 10% of the farm covered by eligible semi-natural vegetation i.e. 10% of farm = 100 points and maximum Eco-scheme payment. Under this system farmers who do not meet 100 points can opt to increase proportion of eligible features on farm through a limited number of complementary actions with proven benefit/co-benefits for biodiversity, water or climate targets e.g. hedgerow planting, riparian buffer zone creation, field margins, native tree planting/farm woodland plots, pond creation etc. The list of actions where feasible could be adapted per farm system or be specific to required actions to meet specific environmental objectives in national priority areas (e.g. priority habitats, high status water bodies, catchments at risk, additional actions for nitrates derogation farms above legislative requirements etc.)

This will require investment in administrative systems and training; however, because Eco-schemes are an innovative instrument, this will be required anyway. There is currently a detailed national mapping programme underway for the entire country set to be completed in 2021. This will map these features at farm level and this resource should be integrated with the LPIS. Since the first introduction of agri-environment schemes in Ireland in 1994 these features/farmland habitats were required to be mapped and identified on all participating farms (at peak participation there were more than 50,000 participating farms), so there should be significant capacity already available in the country in this area. It seems that a pilot Farmland Environment Survey is being considered for implementation by DAFM in 2021, but none of the participants had any further detail on this, or the extent to which it might resolve some of the habitat mapping issues.

A points-based Eco-scheme could also be used to solve the loss of unused funds where there is an underspend. Where there is an underspend, the unspent money could be added onto the unit value of points gained by participants in that year as an eco-bonus payment. In this way, the underspend can be distributed as a dividend among eco scheme participants.

Managing more targeted Eco-schemes and agri-environment-climate schemes will make greater demands on administrative resources in the managing authority. Despite the fact that the overall benefit/cost ratio will improve, the larger upfront investment (e.g. in IT systems) as well as ongoing recurrent costs can be a disincentive for managing authorities to adopt these more ambitious and effective approaches. There should be provision in the CAP budget to reimburse managing authorities for these additional administrative expenses, along the lines of the way provision is made to finance Technical Support for RDPs.

a) In its design (e.g. how AECM or Eco-schemes should be designed/funds allocated/improved)?

EU level	Your Member State (/region)
There should be clear objectives, indicators and targets for biodiversity aims that allow clear assessment of thresholds that distinguish GAEC from Eco-schemes from AECM. Detailed description of implementation will be crucial to inform judgement of whether the proposed actions will be expected to be effective or not.	
Excessive weighting and conversion (as in the EFA measure of Greening) can have the effect of diluting the real 'space for nature' and actual	

area of green infrastructure, and the effectiveness of biodiversity conservation.	
There should be clear reference in the CAP Strategic Plans to an objective evidence base that justifies the effectiveness of proposed actions to be undertaken under Eco-schemes (and in general). The 'cause-and-effect' intervention logic in CAP programming has been most deficient or absent for biodiversity, in comparison to other environmental objectives (Primdahl et al., 2010). The greater the allocation of budget to specific measures, the greater should be the requirement to demonstrate the intervention logic.	
In the same way that external validation of financial costings of proposed measures was required for previous RDPs, there should be external validation of the expected ecological effectiveness of proposed measures. Ideally, this assessment should be part of an <i>ex ante</i> evaluation.	
Farms with a derogation under the Nitrates Directive are required to undertake additional farm management practices; there is a need for clarity about the articulation of Nitrates Directive derogation actions with actions and payments within Eco-schemes	
There is a significant role for EIPs to innovate, stimulate and pilot a variety of targeted biodiversity efforts with different levels of ambitions, which could inform future Eco-scheme design and implementation. Ireland has been developing substantial practical experience in implementing such schemes. These include the BRIDE EIP to the Pearl Mussel Project and Hen Harrier Project .	

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	Your Member State (/region)
Detailed description of implementation in the CAP Strategic Plan will be crucial to inform judgement of whether the proposed actions will be expected to be effective or not.	
The Eco Scheme should (ideally) be adaptive and progressive. It may be difficult to get everything right in Year 1, but one can still be ambitious about what it can achieve over time.	

This highlights the crucial importance of early monitoring and assessment of this new policy instrument, and rapid response to confirm effective actions, and rectify ineffective actions (through removal or modification). Also, the process whereby Member States can change their schemes and obtain Commission approval for these changes should be as easy and painless as possible.	
To achieve biodiversity objectives, the provision of effective advisory support with appropriate ecological expertise will be crucial for all biodiversity actions, and especially for results-based approaches.	
It is envisaged that Eco-schemes will contain a high degree of choice and will contain a mix of light green and dark green options. How will choices be managed to influence selection of, for example, 5 light green options versus 3 dark green options (where the latter have a greater environmental benefit)?	

Specific questions:

Q2.1: what should be defined as minimum requirements for (success of) the Green Architecture as a whole?

Q2.2: what are the pros and cons of a list-based approach (menu of options)?

Comment:

A list-based approach seems to imply that a list of management prescriptions is provided to farmers, and they only implement the prescription to get paid. However, it is possible to envisage results-based payments being offered within a list-based approach.

Pros:

There is a very wide range of available options within the four flagship Eco-schemes. There is very likely to be an option, or set of options, that can be appropriate to a farm that delivers biodiversity benefits.

Spatial targeting could be used to better reflect local environmental priorities e.g. a sensitive water catchment or an important biodiversity asset (e.g. important populations of swans/geese, or other rare/threatened species) where certain options should be incentivised/ prioritised over others. This would require upweighting of the points for more environmentally effective management practices to be preferentially selected in areas with local environmental priorities.

Having the option of not solely concentrating on income foregone and costs incurred allows for the assignment of a value to environmentally valuable areas. Options need to be accurately assigned an

environment benefit value so that the least beneficial actions need to have payment rates that reflect their true lower value. If so, this will allow greater ambition to be achieved within the available budget.

Similarly, there is an opportunity for win-win outcomes where Eco-scheme options can use nature-based solutions. Where co-benefits are explicitly recognised, existing habitats in good condition can be rewarded not just for their biodiversity value, but also for their contribution to carbon capture and sequestration, biological control, water quality and flood regulation etc.

Cons:

The Eco-schemes options included in the CAP Strategic Plans should have associated scientific evidence that demonstrates their effectiveness, and the most appropriate farming contexts for its implementation. In the past, this 'cause-and-effect' model has been most deficient or absent for biodiversity, in comparison to other environmental objectives (Primdahl et al., 2010).

There is a very wide range of available options within the four flagship Eco-schemes. The experience from decades of agri-environment schemes indicates that participants will tend to choose the most financially rewarding of available options (the difference between payment and costs), which may not be the most environmentally effective choice for the local context. (e.g. Cole et al. 2020).

There is a risk of some Eco-scheme options having a net negative effect on biodiversity, if implementation is not associated with proper advice and regulation. Some options may have the effect of displacing existing habitats, if the options are preferentially located on the land with lowest land value, which tends to be those areas with highest likelihood of being farmland habitats with biodiversity and ecosystem services. Implementation should ensure no such backsliding at the scale of individual farms, and the design and payment structure of the Eco-scheme itself should sufficiently reward existing areas of farmland habitats. This should ensure that such back sliding is not a financially attractive option within the Eco-scheme.

Q2.3: If the EU and MSs choose on a menu option, what would you list as examples that should or should not be included?

Examples of potentially effective Eco-schemes:

Examples for good practice	Why
Implement a points-based system with a short list of options relevant to a specific farming context	Simplifies the options for farmers and aligns the available options with the most environmentally effective actions for the farm context.
Conservation of existing high nature value habitats, and to encompass those that occur outside of protected areas.	Many rare species occur outside of protected areas (e.g. Jackson et al., 2009; Walsh et al. 2015; Matin et al., 2016, 2020).
Wider range of habitats to be considered as landscape features, to improve conservation of existing habitats.	Larkin et al. (2019) showed many farmland habitats are present on farmland but considered ineligible.

This approach should also focus on habitats that occur outside of protected areas, many of which contain rare and threatened species.	Rotchés-Ribalta et al. 2020. Preferential loss of habitat types that are not protected by regulation. Older and existing habitats have higher nature value than newly created habitats. (Waesch and Becker, 2009). Many rare species occur outside of protected areas (e.g. Jackson et al., 2009; Walsh et al. 2015)
Restoration of existing habitats from lower to higher nature value	
Creation of new habitats only in areas where there are no existing wildlife habitats.	
Installation of ponds	Ponds are a rich biodiversity resource (Biggs et al., 2015), and have declined in incidence in recent years. Wetland habitats are a biodiversity priority for NPWS. Larger ponds can also assist as a reservoir of water for fire control.
Control of invasive species	These have not featured in previous AECMs in Ireland. Given the severe threat to biodiversity posed by some alien invasive species, this would be a very worthwhile addition to Eco-schemes and AECMs.
Eco-scheme options should explicitly consider the need to deliver co-benefits for carbon, biodiversity & water (quantity, quality). Options that deliver more co-benefits should be more highly rewarded.	This will enhance value-for-money, and better recognise the multiple functions delivered by the same land area.
Wild bird cover strips should also be considered. Wild bird cover including crops such as radish and mustard can be good for pollinators, and offer multiple benefits for biodiversity over an extended season. However, they should not be located on existing habitats.	

Examples of problematic options that should not be included:

Examples of problematic practice	Why
Eco-schemes (and AECMs) should not have the effect of installing newly created habitats on existing habitats that have high nature value, resulting in a net loss of biodiversity.	Older and existing habitats have higher nature value than newly created habitats. (Waesch and Becker, 2009)
'Boost' schemes should not be included within the budget for flagship Eco-schemes,	Boost schemes are aiming to promote competitiveness, rather than environmental goals.
Menu options need to be carefully targeted to the farming system, and the priority environmental issues	Participants tend to choose the most financially rewarding of available options which may not be the most environmentally effective choice for the local context
Actions for conservation of grassland diversity should have zero or very low levels of applied nitrogen.	Kleijn et al., 2008

Q2.5: What are the pros and cons of a top-up payment versus income foregone? What would you recommend and why?**Pros:**

Could allow the welfare value of the environmental outcome to be explicitly rewarded, e.g. carbon sequestration could be rewarded at the market price for carbon regardless of the cost to the farmer to provide the sequestration.

A top up payment can provide a necessary incentive to encourage farmers to participate in the green transition. This may be particularly relevant to actions that provide environmental benefit but may appear to be negative cost for farmers, thus leaving no basis for making a payment for this action even if there is evidence that there is only limited adoption of this measure. Another example is where the intention of the scheme is to maintain existing practices in place where their existence may suggest they are the economically best option for the farm concerned, although the continued existence of the practice may be threatened by future intensification.

Cons:

Anchoring the payments made to farmers in costs incurred or income foregone provides some kind of objective benchmark for the level of payment. In the absence of such a benchmark, the top-up paid becomes a bargaining matter between the public authority and the farm organisations. Given that the top up represents a pure income transfer, there is a big danger that Eco-schemes using this formula will become income transfer schemes in disguise, much like the greening payment in the current CAP.

The Irish evidence suggests there is sufficient flexibility in the income foregone/costs incurred formula to ensure payments constructed on this basis are sufficiently attractive to farmers. Irish agri-environment schemes are consistently over-subscribed. Given a limited budget for environmental schemes, the more this budget is used to finance income transfers rather than environmental action, the less environmental improvement will be achieved. Given the Irish record to date, there seems no

evidence to change a successful formula. What is clear is that payment levels that are averaged across all farms lead to a self-selection bias in that it is those (less intensive) farms where opportunity costs of enrolment are lower that predominantly participate. But this self-selection bias will not be eliminated simply by raising the average level of payment by including a top-up. This requires more targeted interventions differentiated by different target groups.

There can be a need for reasonable application of the costs incurred principle where the continuation of a desirable farming practice (e.g. extensive grazing) is threatened by intensification. This can be achieved by adopting a results-based approach as much as possible.

Q2.6: How should Eco-schemes best be organized spatially, among themselves and with respect to AECM?

Must avoid conflicts between what is designed into Eco-schemes and what can be paid in the more targeted agri-environment schemes.

There should be clear threshold targets between GAEC, Eco-scheme and AECM that would allow a single parcel to receive payments for all three, with a clear gradation of standards.

Q2.7: How should MSs address the multiple objectives (income plus environment) and/or avoid double counting?

No specific suggestions to make under this heading, beyond underlining its importance.

Q2.8: what should happen with remaining budgets if take-up is low?

Given the financial value of the Eco-schemes, very high uptake is expected in Ireland.

If there is unspent budget, the environmental objective of Eco-schemes and the CAP would be best served by allocating it to relevant environmental instruments. For example, this may include a public goods bonus within Eco-schemes whereby a remaining budget gets divided among participating farmers. This could be weighted by Eco-scheme objective and/or to farmer who exceed the basic requirements of Eco-schemes and are not rewarded for the additional public good supply by other instruments e.g. AECM. As another example, unspent Eco-schemes budget could be allocated to AECM in Pillar 2 and spent over a number of years to reward 'deep green' commitments for biodiversity and other objectives.

It is difficult to see how the current proposal to transfer unspent budgets into income support would result in additional environmental benefit, compared to alternative approaches.

Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?

S.M.A.R.T.: “Specific, Measurable, Ambitious/attainable, Realistic, Time bound”

Note: The Biodiversity strategy requires a) 10% landscape features, b) expansion of organic farming to 25% UAA and c) reduction in pesticide (impacts) by 50%.

What key factors and considerations should be made by MSs when setting targets in their CAP strategic plans, and how should the EU guide and assess them?

EU level	Your Member State (/region)

General background

This topic relates principally to targets set at Member State level rather than at farm level (results-based approaches) though the last question in this topic provides an opportunity to link the two.

Question 3 (targets) was discussed prior to Question 4 (indicators) although in EU terminology a target is a quantified value for an indicator. It is difficult to discuss targets without first knowing what the indicators are, so there is some overlap between responses to Q3 and Q4.

The preamble to the CAP SP Regulation (Recital 56) includes the requirement: “In the process of development of their CAP Strategic Plans, Member States should analyse their specific situation and needs, **set targets linked to the achievement of the objectives of the CAP** and design the interventions which will allow reaching these targets...” (bolding added). In Article 7 of the Regulation, it is indicated that achievement of the CAP objectives shall be assessed using **impact indicators**. In the Regulation itself, a ‘target’ is defined as a pre-agreed value to be achieved at the end of the period in relation to the **result indicators** included under a specific objective” (Art. 2(i)). There is no obligation in the Regulation for Member States to define targets for their impact indicators and that this requirement is only referenced in the preamble.

The specification of the contents of the Strategic Plan (Article 95) only requires Member States to include an assessment of needs and to identify needs for each CAP specific objective (Article 96). It does not require inclusion of targets based on impact indicators as a component of the Strategic Plan. The Commission will have difficulty to fulfil its duty under Article 106 to assess the draft Plans submitted by Member States on the basis of their “effective contribution to the specific objectives...” in the absence of quantified impact indicators included in the Plan.

The draft Strategic Plan Regulation requires Member States when drawing up their Strategic Plans for the specific environmental and climate objectives to take into account the national environmental and climate plans emanating from a list of legislative instruments in Annex XI that includes the Birds and Habitats Directives. This provides a basis to integrate quantitative targets established under these plans into the CAP Strategic Plans.

Furthermore, the Commission will be issuing guidelines to Member States, based on its assessment of their starting positions, regarding the level of ambition it might expect with regard to the specific targets set out in the Green Deal documents, including the European Climate Law, the Farm to Fork Strategy, the Biodiversity Strategy and the Circular Economy Strategy. These will not be binding recommendations, but Member States should be put under pressure to explain why they would not want to adopt these recommendations.

Results-based indicators, targets and milestones as set out in the draft Strategic Plan Regulation can be appropriate for annual monitoring but are not a substitute for proper measurement of the effectiveness of interventions in achieving the specific objective 6(f) to “contribute to the protection of biodiversity, enhance ecosystem services and preserve habitats and landscapes” (the biodiversity objective).

Impact indicators will be assessed on a multi-annual basis in connection with mid-term and ex-post reviews to evaluate policy performance. There is no sanction for Member States that are not on track to meet specific objectives related to environment and climate.

Specific questions:

Q3.1: What would count as “ambitious” targets? (how do you measure ambition?)

The three suggested impact indicators for biodiversity in the draft Strategic Plan Regulation. These are:

I.18 Increasing farmland bird populations

I.19 Percentage of species and habitats of Community interest related to agriculture with stable or increasing trends

I. 20 Share of UAA covered with landscape features

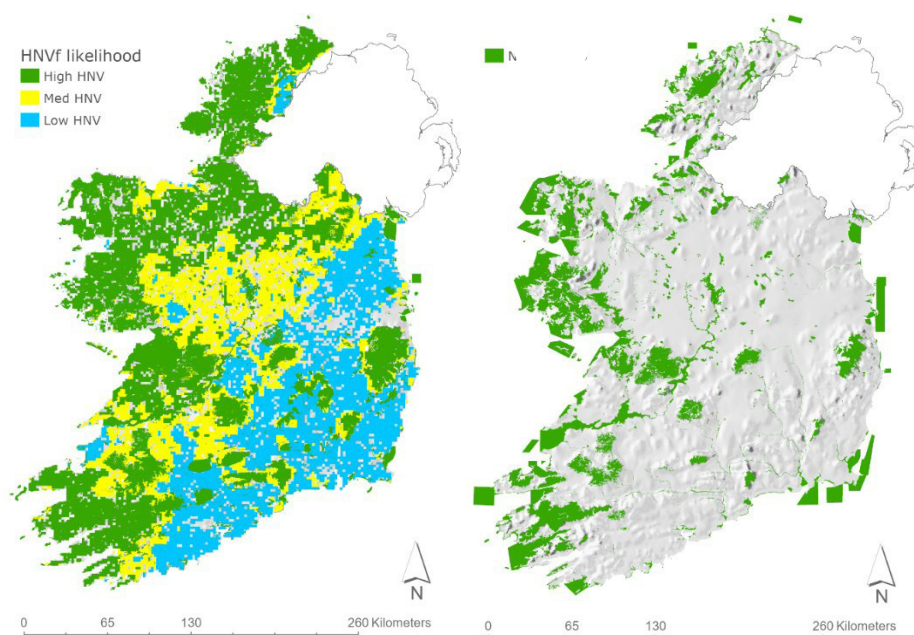
Additional supplementary impact indicators should be considered (see also Question 4). One additional target could be the maintenance/extension of High Nature Value farmland, the distribution of which can now be estimated in Ireland (see Fig. 3, from Matin et al. 2020). However, this would only change very slowly over time. The ability to predict the spatial distribution of HNV could be used to formally test whether there is ‘targeted allocation of resources to HNV’. The amendment to include a result indicator as proposed in the EP position R29b *Fostering high nature value farming: share of agricultural area under management commitments to generate high nature value* deserves support.

Ideally, it would be desirable to have indicators of habitat quality for ubiquitous habitats such as hedgerows and field margins, ponds. There is potential to use the outcome of results-based agri-environment schemes to feed into a nationally aggregated indicator.

Regarding **level of ambition**, the ultimate objective must be that all habitats are in improving or favourable condition, that all protected species have stable or improving status and that farmland biodiversity (especially in the wider countryside, and not just in Natura 2000) as measured by a

range of indicators is in a healthy state. Targets in the CAP Strategic Plan should be aligned with EU Biodiversity Strategy target: “There should be no deterioration in conservation trends and status of all protected habitats and species by 2030. In addition, Member States will have to ensure that at least 30% of species and habitats not currently in favourable status are in that category or show a strong positive trend.” As the CAP Strategic Plan will have an end date of 2027, interim targets should be set that would allow the achievement of the EU Biodiversity Strategy target by 2030.

Fig. 4: (a) Extent and distribution of High Nature Value farmland in the Republic of Ireland (adapted from Matin et al. 2020), and (b) Natura 2000 network in the Republic of Ireland



The Biodiversity Strategy minimum threshold of 10% for space for nature in the wider countryside (based on a wider definition including landscape features as discussed under Question 1) would be an ambitious target. This could be achieved in Ireland through a combination of conditionality under GAEC 9 and incentivised measures to go beyond this mandatory minimum in Eco-schemes and AECMs as discussed earlier. “Studies from across Europe show that if a minimum of 10-14% of agricultural land were to be non-productive, then birds, and thus other wildlife, would recover (Busch et al., 2020; BIOGEA, 2020; Traba and Morales, 2019; Walker et al., 2018; Langhammer et al., 2017; Pe’er et al., 2014; Oppermann, 2008). It is the minimum, as at landscape level, 26-33% may be required for landscape-level recovery (Walker et al. 2018). Until 2008, it was compulsory for all farms to leave 10% of their land fallow. Not intended as a biodiversity measure, it indirectly had a significant positive impact for wildlife (Traba and Morales., 2019).”

Additional indicators that could be used to measure ambition in the CAP Strategic Plans include: decisions on regulation and funding e.g. thresholds between GAEC and Eco-scheme and AECM; allocation of unspent Eco-scheme budget to environmental aims ONLY, or its allocation to AECM

in Pillar 2; going beyond minimum commitments to EIPs that address biodiversity; going beyond minimum commitments to build ecological expertise into Advisory Services.

Q3.2: How should baselines be defined? (e.g. in terms of year, UAA/habitat cover etc.)

One issue is the definition of the reference year. For climate targets there are international obligations that set the reference year. For many relevant biodiversity targets, there is inadequate baseline information because country-wide monitoring has been lacking. Ideally, the baseline year would be the start of the Strategic Plan period.

Under Article 17 of the Habitats Directive, Member States are obliged to report on the conservation status of natural habitats and wild species listed in the Annexes to the Directive every six years. For Article 17 reporting (Natura 2000), reference year can be the last report, and there will be verifiable evidence to assess change.

Regarding the definition of scope, it was highlighted that measuring biodiversity on UAA alone does not necessarily capture farm biodiversity. Measuring biodiversity through Article 17 reporting alone also omits large areas of farm biodiversity e.g. high nature value farmland, and the wider countryside.

Q3.3: What should/could be done so that MSs would be ambitious in setting, measuring and meeting the targets?

Member States should be required to set quantitative targets, based on their needs assessment for their impact indicators in the Strategic Plan.

Member States in setting impact indicator targets should relate these not only to the CAP specific objective but also to the Member State commitments to relevant Sustainable Development Goal targets and indicators.

The Strategic Plans will contain an intervention logic indicating how the chosen interventions are expected to contribute to achieving the biodiversity objective 6(f). Past experience indicates this intervention logic is often absent, least developed, or counter-intuitive for biodiversity (e.g. Primdahl et al., 2010; European Court of Auditors, 2011). Independent ecologists should be involved in formal ex ante assessment of the intervention logic for those measures contributing to the biodiversity objective.

Q3.4: What should MSs do to ensure that their targets translate into actions by farmers?

Recall that AECM and Eco-schemes are both voluntary. If they are not attractive, farmers will not take them up and, consequently, MSs may not be able to meet the targets.

Please try to provide concrete, feasible examples

This question was addressed as part of Questions 1 and 2.

Q4: What landscape- and biodiversity indicators could be used to strengthen the indicator-system of the CAP?

There are 4 types of indicators:

1. Output indicators relate to how MSs spend the budgets
2. Result-indicators are measured yearly and should relate to (proxies of) their potential impacts
3. Impact-indicators (reported every several years, e.g. during mid-term evaluation and at the end of implementation) are parallel to how ecologists often consider “results” (i.e., actual impacts on the ground, e.g. farmland bird indicators). In post-2020 CAP, this will include “Landscape features” and “Status of species and habitats of the Habitats Directives”.
4. Complementary Results Indicators to link CAP instruments to concrete outcomes such as biodiversity

Based on interactions with DG AGRI, we focussed on Impact and Complementary Results indicators and we considered effective indicators as those that address the following criteria:

- feasible to monitor, with already monitoring efforts and data available
- straightforward to analyse and report across (several or all) Member States
- potentially address different aspects of the landscape or biodiversity.

While indicators on other aspects (e.g. GHG emissions, farm income, equity) are of interest and welcome, we focused on indicators for biodiversity.

Key message: Funding should be included in the Strategic Plan for resource collection and interpretation of data that can assess the impact of CAP instruments on biodiversity.
--

To date, ONLY research projects have generally been able to effectively investigate the effectiveness of CAP measures on biodiversity. It would be preferable to ensure that funding is allocated to research projects rather than to consultants to perform evaluations that are often anodyne and not very informative. The greater the budgetary allocation to a policy instrument, the greater the priority that should be given to its evaluation (Finn and Ó hUallacháin, 2012).

Taken from reply to Q3:

Additional supplementary impact indicators should be considered. One additional target could be the maintenance/extension of High Nature Value farmland, the distribution of which can now be estimated in Ireland (see Fig. 3, from Matin et al. 2020). However, this would only change very slowly over time. The ability to predict the spatial distribution of HNV could be used to formally test whether there is ‘targeted allocation of resources to HNV’. The amendment to include a result indicator as proposed in the EP position R29b *Fostering high nature value farming: share of agricultural area under management commitments to generate high nature value* deserves support.

Q4.1 How can landscape features be best mapped?

Ireland does not currently have a national, high-resolution land use/habitats map. One is in development by the EPA/OSI, due for delivery Q3/4 2021. This will give information on *quantity* of landscape features, but not their *quality* (ecological condition for biodiversity). Ireland did establish an eREPS mapping system <https://joinup.ec.europa.eu/collection/geographic-information-system-gis-software/document/online-gis-increase-efficiency-farm-surveying-ereps> to support the REPS agri-environment scheme in the 2000s, but this was not maintained.

This system won an innovation through technology award in 2006. This contained data for the around 42,000 farms enrolled in REPS at that time, including data on measure 4 in REPS where all habitats had to be mapped. The fact that it was not pursued has meant a real loss for biodiversity monitoring in Ireland, but it shows what can be done.

The best approach to mapping is to combine remote monitoring (satellite), complemented with subsampling/ground-truthing, potentially with better use of Copernicus data. There is the potential for a disconnect between on-the-ground and remote sensed data (e.g. under canopies), hence the need for ground-truthing. Remote sensing could reduce the frequency of field assessment rather than replace it. Time-series remote sensing could be very useful for gauging change through the growing season, e.g. mowing dates. Scale is an issue in remote sensing – some landscape features may be too small to be captured remotely (e.g. field margins <2m width) and grasslands need to be disaggregated into intensive, extensive and semi-natural.

There has been good progress made using apps for on-the-ground mapping (e.g. in the [Pearl Mussel Project](#) and [Hen Harrier Project](#) EIP projects, and others), but logistical problems in making data available, and aligning datasets remain. The National Biodiversity Data Centre could play a role here. The DAFM are currently rebuilding the LPIS system, and this should be designed to cross-talk with externally-built technology/applications.

It seems that a pilot Farmland Environment Survey is being considered for implementation by DAFM in 2021. This sounds promising, but none of the participants had any further detail on this, or the extent to which it might resolve some of the mapping issues.

Q4.2 How can the methods for biodiversity indicators be improved, for the habitats and species of the Habitats Directive? Is it feasible in your country?

Current methods for surveying habitats and species for Article 17 reporting in Ireland are considered adequate, but should be extended to more farmed land in the wider countryside.

The Countryside Bird Survey (CBS, established 1998) monitors farmland bird populations (as well as the populations of other bird species occurring in the wider countryside) (Lewis et al. 2019). CBS data is used to evaluate impacts of agri-environmental policies in Ireland through the Farmland Bird Index, but may have missed early/long-term declines that began/occurred prior to 1998 (Corkery et al. 2020).

Q4.3 What are the best biodiversity indicators that can be proposed for the Complementary Result Indicator (FA 4A)?

The Irish Environmental Protection Agency (EPA) has invested in monitoring for aquatic taxa, in response to Water Framework Directive requirements. Except for a regular National Forest Inventory (NFI), similar monitoring has not been invested in, nor developed, for terrestrial biodiversity. **This is urgently needed.** A national countryside survey (e.g. similar to <https://countrysidesurvey.org.uk/>) is required to form the baseline.

Indicator	Justification	For all MSs?
Quantity of landscape features/habitats	Most easily mapped using remote methods and verified with ground-truthing	yes
HNV farmland extent	HNV farmland is a very important refuge for biodiversity outside of Natura 2000 areas, and well recognised by previous CAP policies. Most of European farmland biodiversity is found on HNV farmland so the maintenance of these areas is vital http://www.hnmlink.eu/download/D4.3.HNV-Link_Policy-Brief_v2019-3-25.pdf	yes requirement in current CAP
Quality of landscape features/habitats, assessed via scorecards	Gives indication of biodiversity condition, which relates to ecosystem service provision; can be linked to payments for ecosystem services/results-based payments	yes
Article 17 (habitat and species) monitoring	Methods established, expand into non-protected farmland areas	yes

EU Pollinator Monitoring Scheme	Already designed, standardised monitoring that is consistent across MS, goes beyond plant indicators*	yes
---------------------------------	---	-----

*Note: Pollinators are specifically included in the EU Biodiversity Strategy to 2030 as one of the ways of restoring biodiversity in terrestrial systems. The EU Pollinator Strategy has published a Pollinator Monitoring Scheme <https://wikis.ec.europa.eu/display/EUPKH/EU+Pollinator+Monitoring+Scheme> developed by the JRC, which includes a methodology and policy indicators (including ones for the CAP). There is potential to implement this in Ireland, although a key question is who will fund it and whether there will be any funding from Europe. Ireland has the All-Ireland Pollinator Plan guidelines for Farmland <https://pollinators.ie/farmland/>, which are evidence-based actions that can be implemented across all farmland types. The EIP Protecting Farmland Pollinators project <https://www.biodiversityireland.ie/projects/protecting-farmland-pollinators/> is testing whether these actions can be rewarded using a score card and results based payments system.

Specific questions:

Q4.1: Can result- / impact-indicators relate to result-based payments? If so, how?

Results-Based Payment models, with score-cards for assessment and monitoring of on-farm landscape feature quantity and quality, could be used. These already exist (e.g. via the EIP projects, Farm-Ecos project) and could be used to aggregated and standardise the reporting of results to underpin a national monitoring and reporting scheme.

Q4.2: Can the proposed indicator(s) be introduced already in the coming CAP? If not, what are the barriers and what should be done?

There has been no funding for monitoring baseline biodiversity indicators at the wider countryside scale. Science can improve the way indicators are used for performance evaluation systems, but this **requires funding** for researchers.

Many methods focus on plant indicator taxa, habitat quality/structure, but monitoring of other taxa is also required (Delaney and Stout 2018). The expertise is available nationally and technological advancements need to be incorporated. This **requires funding**.

A suite of taxon and habitat based monitoring schemes could be combined in different ways, but a national biodiversity data platform, that aligns with existing datasets, is required.

Reply Italy

Workshop facilitators: Stefano Targetti, Davide Viaggi (University of Bologna, Department of Agricultural and Food Sciences - Agricultural Economics)

Participants: Giovanni Burgio, Gianfranco de Geronimo, Antonio Finizio, Francesco Galioto, Carlo Malavolta, Danilo Marandola, Stefano Targetti, Davide Viaggi (organiser), Matteo Zavalloni Giovanni Burgio (University of Bologna, Department of Agricultural and Food Sciences, General and Applied Entomology), Gianfranco de Geronimo (Regione Emilia-Romagna – Servizio Agricoltura Sostenibile D.G. Agricoltura Caccia e Pesca), Antonio Finizio (University of Milan Bicocca, DEPARTMENT OF EARTH AND ENVIRONMENTAL SCIENCES), Francesco Galioto (CREA - National Agricultural Research Council), Carlo Malavolta (Regione Emilia-Romagna – D.G. Agricoltura Caccia e Pesca), Danilo Marandola (CREA – National Agricultural Research Council), Stefano Targetti, Davide Viaggi (organiser), Matteo Zavalloni (University of Bologna, Department of Agricultural and Food Sciences – Agricultural Economics)

Workshop date: 02.11.2020

Q1: How can the different Green-Architecture elements optimally complement each other?

(What key factors and considerations should be made in ensuring the Green Architecture operates best?)

a) In its design (e.g. how AECM or Eco-schemes should be designed/funds allocated/improved)?

EU level	Italy
	An average 75 € ha⁻¹ y⁻¹ could be allocated to the Eco-schemes in Italy (assuming 20% of budget earmarked for Eco-schemes). Two main Eco-schemes strategies could be implemented: 1. Maximise the uptake in terms of hectares/farms through budget for „non-material“ actions such as data collection, planning (grazing-, irrigation- plans). That would provide tools for improving the environmental performance and data availability. 2. Targeting higher impact actions such as organic and/or integrated farming (or other agro-ecology-based transitions). Degressive and capping mechanisms would be required to avoid concentration of

	funds on few farms⁵. Those actions could also include budget for collective uptake of the measures to maximise the environmental impact. Mix of the two strategies could also be possible.
--	---

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

(NA)

Specific questions:

Q1.1: What are the most important pros and cons of each instrument?

Instrument	Pros	Cons
AECM		Data gaps to assess the actual environmental effectiveness
Eco-schemes	A range of potential aspects like the top-up mechanism. Yet, the tool is not clear enough to judge	Overlapping with 2 nd Pillar could be complicate for implementation
Enhanced Conditionality	Reinforce the effectiveness of the CAP to reach agri-environment objectives	It may discourage farmers' uptake

Q1.2: How can the EU and Member States (MSs) reduce conflicts and maximise synergy among Green-Architecture instruments?

EU level	Your Member State (/region)
A relevant issue concerns the double funding. To not incur in double funding, the targets of the 2nd Pillar of the CAP should be differentiated. A risk is to have Eco-schemes incentives that work as AECM, that would make the implementation and design of the	Maintenance of past agrienvironmental interventions should be included to avoid inefficiencies. New interventions and maintenance of past interventions should go hand in hand.

⁵ Authors comment: We note that a different view was taken on this issue in the German workshop, with participants stating that "there is no empirically verifiable evidence that the concentration of land ownership has an impact on environmental performance."

Eco-schemes complicate for the decision-makers. For instance, a differentiation could be between incentives for pluriannual interventions/ impacts (by AECM) vs. annual interventions/ impacts (by Eco-schemes).	Any agro-ecological intervention should be associated with input reductions, in particular pesticide reduction. Incentives for pollinator-friendly elements make little sense if not associated with pesticide reduction. As a minimum requirement, buffer zones „pesticide-free“ should be included for any agro-ecological infrastructure. That would be similarly to the ban of pesticides in nitrogen-fixing cultures that was proposed in the Greening.
--	--

Q1.3: What are the barriers, caveats to consider?

EU level	Italy
	Organic and integrated farming have the advantage to be linked to external independent agencies performing the monitoring. That is an advantage for local institutions managing the implementation of the CAP.

Q1.4: Are there (additional) CAP- instruments that should be considered for the Green Architecture? Under which conditions?

(NA)

What should be defined as minimum requirements from MSs to ensure success of the Green Architecture as a whole?

Input reduction. However, data on input usage is in general not available. That would be a relevant information for monitoring impacts and quality of any environmental scheme.

Q2: What can be the role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?

What key factors and considerations should be made in ensuring the Eco-schemes are attractive (for MSs and farmers), effective, cost-efficient (in relation to the spent budget) and synergistic with AEEM and other instruments? *(Please remember that measures should fit to an annual scheme and applying for an Eco-scheme is voluntary for farmers)*

a) In their design (e.g. how AEEM or Eco-schemes should be designed/improved):

(NA)

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

(NA)

Specific questions:

Q2.1: What should be defined as minimum requirements for Eco-schemes to contribute to the success of the Green Architecture as a whole?

(NA)

Q2.2: What are the pros and cons of a closed list-based approach (menu of options)?

Pros	Cons
A menu of options is fine if farm level planning is part of the approach. Agro-ecological interventions are effective when agrosystem features (farm and local environment conditions) are taken into account.	

Q2.3: If the EU and MSs choose on a menu option, what would you list as examples that should or should not be included? *(Please remember that measures should fit to an annual scheme and applying to an Eco-scheme is voluntary for farmers)*

Examples of concrete, potentially-effective/cost-efficient Eco-scheme options that should be included:

(NA)

Examples of concrete, ineffective or problematic or cost-inefficient options that should not be included:

(NA)

Q2.4: What are the pros and cons of a top-up payment versus income foregone? What would you recommend and why?

Some considerations on top-up payments were highlighted at the workshop: In general, the top-up mechanism was considered positive as it could facilitate the implementation of important approaches such as collective and result-based schemes.

Q2.5: How should Eco-schemes best be organized spatially, among themselves and with respect to AECM? Please consider: How can this be promoted by the EU and administrated by MSs? How to balance cost-efficiency of the measure (focus on hot spot) vs. Broad scale application?

The spatialisation of Eco-schemes is likely the most important aspect of the Eco-scheme design. A focus on ecological corridors and more in general connections between ecological infrastructures is necessary. Degraded lands should be focused in particular. For instance, increasing field margins is considered relevant even though that is more fitting to North Europe regions.

Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?

S.M.A.R.T.: “Specific, Measurable, Ambitious/attainable, Realistic, Time bound”

Note: The Biodiversity strategy requires a) 10% landscape features, b) expansion of organic farming to 25% UAA and c) reduction in pesticide (impacts) by 50%.

What key factors and considerations should be made by MSs when setting targets in their CAP strategic plans, and how should the EU guide and assess them?

(NA)

Specific questions:

Q3.1: What could count as “ambitious” targets? (how do you measure ambition?)

Pesticide reduction is paramount.

Q3.2: How should baselines be defined? (e.g. in terms of year, UAA/habitat cover etc.)

Mapping the UAA under organic farming is one of the relevant issue, but temporal dynamics should be considered as well.

Q3.3: What should/could be done so that MSs would be ambitious in setting, measuring and meeting the targets?

(NA)

Q3.4: What should MSs do to ensure that their targets translate into actions by farmers?

Recall that AECM and Eco-schemes are both voluntary. If they are not attractive, farmers will not take them up and, consequently, MSs may not be able to meet the targets.

Please try to provide concrete, feasible examples

Q4: How can science improve the way indicators are used for performance evaluation of the CAP?

Note that the CAP comprises Output, Result and Impact indicators and in the next period also Complementary Result Indicators (CRI). Annexes are closed but a) methods can be improved and b) the CRI requires indicators for biodiversity.

Specific questions:

Q4.1 How can landscape features be best mapped? (Impact indicator to be used in the next CAP. Needs to be up to date, detailed)? It is feasible in your country?

Indicator	Justification	For which MSs?
GIS database of landscape elements on which a range of indicators on landscape structure and composition could be assessed	It optimises usefulness and feasibility	Useful in all MSs and in particular for Mediterranean regions.

Q4.2 How can the methods for biodiversity indicators be improved, for the habitats and species of the Habitats Directive? (Impact indicator to be used in the next CAP). It is feasible in your country?

Improving the availability of pesticide use data. It is extremely important to monitor and understand effectiveness of any AE scheme. However, data are lacking.
--

Q4.3 What are the best biodiversity indicators that can be proposed for the Complementary Result Indicator (FA 4A)?

“Restoring, preserving and enhancing biodiversity, including in NATURA 2000 areas, and in areas facing natural or other specific constraints, and high nature value farming, as well as the state of European landscapes”. See also here: https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/complementary-result-indicators-pillar-ii_en.pdf

Note: such indicators should be feasible to collect and analyse in multiple MSs, they have a running monitoring system, and can clearly interlink CAP measures and biodiversity.

Indicator	Justification	For which MSs?
Many and complementary biological indicators do exist. The problem is not availability of valid indicators but their practical application: who will be charged for the monitoring? And more important, who will cover the costs?		
The farmland birds index (FBI) is still useful		Applied successfully in Emilia & Romagna Region in the 90's
Syrphidae monitoring could be interesting	The tool "Syrph the Net" allows an assessment of environmental quality by comparing expected vs. counted species. Syrphidae provide several ecosystem services, biological control at larval stage, pollinators as adult.	Could be already applied in Europe and N. Italy
Pollinator species monitoring is relevant	Important services and iconic species	Difficult implementation because of taxonomic impediment and costs
Butterflies	Important services and iconic species	Wider availability of experts and taxonomists (also following citizen-science approaches like for the FBI). However, some concerns about data quality of citizen science have been raised.
In general, it has been proposed to identify two indicator groups: 1) generic/general indicators based on available data. 2) specific biological indicators to cross-check the information provided by the generic indicators.		

Beside iconic species there are a range of complementary indicators to be considered such as soil meso/macrofauna	Providers of relevant agro-ecosystem services (interesting for farmers too).	
Alien species monitoring	A true concern for agriculture and the cause of a relevant increase of pesticide use.	

Reply Poland

Workshop facilitator: Edward Majewski

Participants: Wawrzyniec Czubak (Poznań University of Life Sciences), Ewa Kiryluk-Dryjska (Poznań University of Life Sciences), Edward Majewski (Warsaw University of Life Sciences), Agata Malak-Rawlikowska (Warsaw University of Life Sciences), Mariusz Matyka (Institute of Soil Science and Plant Cultivation), Wiesław Musiał (University of Agriculture in Krakow), Andrzej Parzonko (Warsaw University of Life Sciences), Arkadiusz Sadowski (Poznań University of Life Sciences), Wojciech Sroka (University of Agriculture in Krakow), Piotr Sulewski (Warsaw University of Life Sciences), Adam Wąs (Warsaw University of Life Sciences), Wioletta Wrzaszcz (Institute of Agricultural Economics), Marek Zielinski (Institute of Agricultural Economics), Wojciech Ziętara (Institute of Agricultural Economics)

Workshop date: 11.12.2020

Q1: How can the different Green-Architecture elements optimally complement each other?

What key factors and considerations should be made in ensuring the Green Architecture operates best?

a) In its design (e.g. how AECM or Eco-schemes should be designed/funds allocated/improved)?

EU level	Poland
- Offer for various types of farms - The more common nature of Eco-schemes - Covering a broad spectrum of goals - Eco-schemes relatively simple - Relations between Eco-schemes and Agri-Environmental Programs (AECM) – "balanced" so that farmers do not move away from AECM to Eco-schemes. - AECM programs attractive enough to farmers - Eco-schemes must be administratively simple to implement and control (reducing the already spread bureaucracy); - Simple and trouble-free control mechanisms for farmers to be designed. - Eco-schemes must be consistent with each other and with other supported CAP measures (e.g. the cultivation of legumes – an important	- What is needed is a vision (strategy) for the development of agriculture in Poland and then introducing eco-schemes, not the other way around; - Eco-schemes should not compete with AECM; - Eco-schemes should be "result based" or "evidence based"; - Eco-schemes should be more closely related to production practices and AECM to environmentally valuable hot-spots; - In view of the annual perspective of the instrument, it is reasonable to introduce a bonus for the continuation of the activities undertaken. This means less risk for farmers compared to AECM - Relationships with the objectives of the CAP should be taken into account and potential conflicts should be eliminated,

group of plants in crop rotation and improvement of the protein balance); - Seeing the growing demand for food in the near future in the world (increasing population), one must be cautious about limiting (extensifying) agricultural production ("do not overdo"); - Matching practices to problems in a given country: - including stopping unfavorable processes, - protection of environmental resources and improvement of their condition; - Certain thresholds related to the beneficial effects on the environment and climate should be the same for all Member States. It should not be the case that, for example, in all Member States it is proposed to reduce the fertilization in the same way, e.g. by 20%. Such actions, to a certain extent, would punish (farmers) countries for the previously rational (from the environmental point of view) practices. - It is advisable to prioritize activities under Eco-schemes / differentiation in the Member States due to local problems / unfavorable soil conditions, areas particularly exposed to drought / erosive areas	- It is advisable to create groups of activities under Eco-schemes targeted at specific regions of the country (their problems) - Grading the difficulty of a given practice within the framework of mutual conditionality, Eco-schemes and AECM - Eco-schemes can be reduced for some areas – some may have a negative impact on the environment! In the mountains, one should not "pay for set-aside" or other activities that will favor land abandonment. - Environmental and social goals should be integrated - The offer of Eco-schemes should include proposals for both large and small farms. - Due to the large number of farms, simple administrative solutions are necessary; - In addressing the subsidies related to the positive impact on the environment and climate, farmers (regions) who already apply good agricultural practices included in the Eco-schemes offer must be taken into account – they cannot be punished for having "worked well" before. - The existing packages should be taken into account and adequate changes should be introduced, including extending the offer - The use of several Eco-schemes could be rewarded with additional funds (additional bonus). This element can be narrowed down to LFA areas, mountain areas, NATURE other areas of natural value) - Elements of green architecture at both national and EU level should be cascading and complementary. Eco-schemes should be a development of conditionality requirements, while AECMs should address current environmental challenges that need to be addressed in the longer term.
--	--

In both cases:

- the AECM program requires a 5-7 year contract, while Eco-schemes are annual commitments. Therefore Eco-schemes have a chance to complement AECM in the form of ad hoc activities.
- the commencement of activities under Eco-schemes may become an incentive to expand and deepen the activities of the farmer and enter into long-term commitments in the AECM program
- all elements of green architecture contribute to increasing the farmer's knowledge and awareness of all cross-cutting objectives of the CAP 2021-2027
- It is necessary to take into account the issues related to the improvement of the water balance (water deficit and care for retention).

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level)

EU level	Poland
- Sufficiently long list of Eco-schemes suited to various situations - Adapt the set of measures and rates to local / regional circumstances - AECM focused on more environmentally valuable areas - Support for communication and training, so as to convince farmers to participate and the advisability of implementation - Taking into account the creation (science) and implementation (agricultural practice and consulting) of modern production techniques ensuring food safety while reducing the use of industrial means of production, - It is advisable to monitor the condition, changes (index assessment) and activities of farmers	- Risk – how to define the patterns so that they do not coincide with the practices that are commonly used by farmers so far. Maybe it's worth paying for good practice introduced already by some farmers so that it becomes common in the future as a standard. - Simple administrative solutions resulting in the interest of farmers and easy (possible) control of implementation; - Dissemination of programs through: training activities for farmers, development of instructional videos and other information materials; - Conducting trainings for employees who administer the system; - The method of implementing Eco-schemes is very important in Poland due to the fragmented farm structure. - Also at the stage of implementing the new green architecture, the legitimate cascade, complementarity and subsidiarity will be of key importance. It is also necessary to implement individual measures in an appropriate time horizon (short, medium and long-term) enabling the solution to existing problems and the achievement of the assumed goals. - Regionalization and prioritization of activities should be considered, perhaps also differentiating payment rates depending on the needs of the regions

Specific questions:**Q1.1: What type of measures should each Green-Architecture instrument focus at from an environmental perspective?**

Instruments	Should cover...
AECM	- More "focused" long-term commitments, being a set of ambitious practices giving a large and lasting environmental and climatic effect, eg mid-field trees. - More ambitious, but much better paid than Eco-schemes. More adapted to regional conditions (LFA, NATURA 2000, etc.), e.g. The focus should be on the protection of valuable natural habitats (permanent grasslands), where extensive agricultural production is carried out, - The undertaken activities should enable the achievement of the environmental objectives (4-6) of the strategic plan. - They should take into account the importance of regional needs in terms of environmental problems - All previously implemented under RDP 2007-13 2014-2020 should be kept
Eco-schemes	- Environmental effects possible in the short term and large scale of implementation, easy to implement, easily measurable, understandable for farmers, with a lower level of environmental and climate ambition, without the need to reorganize the entire farm - One-year commitment periods seem to be a good idea. Some farmers are very afraid of 5-year obligations. However, as the most recently conducted study shows, especially younger farmers would be keen to accept 5 years contracts (choosing between 1, 5 and 10 years length). - Eco-schemes should focus on the core GAEC guidelines - Actions aimed at improving the quality of the soil (crop rotation, water retention, use of catch crops). Additionally, the possible possibility of dividing Eco-schemes into those that improve soil productivity (and those dedicated to particularly large and intensive farms) and contribute to the extensification of production (and dedicate them especially to small entities and managing valuable habitats) should be taken into account. - To a greater extent take into account the maintenance and even restoration of agricultural production in extremely extensive (abandoned) areas - They should be related to animal production: 1) pasture feeding of ruminants, 2) selected elements of increasing animal welfare, e.g. larger building area than indicated in the standard.
Enhanced Conditionality)	- There must be conditionality control for small farms, but it can be slightly reduced (without the need to keep extensive documentation),

	- The actions are obvious and obligatory for all farmers in the whole EU, but one can ask whether they should be more or less ambitious. For example, it is inappropriate, for example, to talk about crop rotation on a farm without specifying how to measure them. Should shifting be obligatory? It should be seen that in the cases of a certain model of organization, e.g. farms focused on dairy cattle rearing, with relatively small land resources, where the sowing structure includes only maize grown for silage (sometimes replaced with grasses for GO) the question arises: Is it necessary to tear this model down in the name of an undefined "change"? Is reducing the cultivation of maize on the farm, which is one of the plants best assimilating CO₂, a "pro-environmental" measure? - Desired activities must be clear and measurable - High and fast penalties for non-compliance with certain standards
--	--

Q1.2: Which conflicts between instruments, that you are aware of, can be resolved in the new Green Architecture and how? (at EU level or in your country)

Problem	Solution
• Natural grazing under Eco-schemes can lead to increased GHG emissions • support related to production (e.g. subsidies for cows) may induce farmers to increase the density above the preferred standards, • There may be non-compliance with Green Deal and Farm to Fork strategy – do we have examples of this? • Less ambitious actions will crowd out more ambitious ones. • Pro-environmental activities limit the competitiveness of farms. • Preserving the grazing of animals on the pasture in sensitive areas (LFA, Natura, etc.) • Duplication of obligations in instruments • The need to produce an appropriate amount of food (nationwide and in the EU) versus the requirement to limit the inputs of industrial means of production • Often low level of social capital among farmers, necessary to achieve ambitious goals • Conflicts are difficult to limit because the natural activity of a farmer is to strive to	Consider removing this payment or replacing with a less conflicting form of support Proper rate calculation • Make payments conditional on the obligation to keep animals on the pasture for at least 2 months a year. • the level of expectations for further instruments should be precisely defined, starting from conditionality, through Eco-schemes, to the AECM program • Applying modern production techniques, including precision farming. • New tasks for agricultural consulting / advisory services • Premia to payments for implementation of specific measures by groups of farmers (e.g. minimum 15)

increase the efficiency (profitability) of work, which means increasing the scale and intensity of production, while "Eco-schemes" and other pro-environmental mechanisms are to "slow down" him by offering specific funds in return. • Balancing implementation of environmental, economic and social goals. • Promotion of practices in livestock production that may increase the content of organic matter in the soil, and reduce greenhouse gas emissions, towards EU climate neutrality in 2050. • Conflict due to imprecision of practices in individual elements of green governance (no clear distinction between conditionality requirements, Eco-schemes and AECM programs). • The risk of "overlapping" practices with the requirements of conditionality, Eco-schemes and AECM	• Only attractive (relatively high) rates for specific pro-environmental activities can slow down the natural direction of changes in farms, which is the pursuit of increasing the efficiency (profitability) of one's own work – the basic indicator in a free market economy. • Through the appropriate allocation of resources, the achievement of the above-mentioned objectives can be balanced. It should be borne in mind that excessive development of environmental and climate instruments will weaken the achievement of economic and social goals. • Greater emphasis on investments in fixed assets on farms: to modernize barns, improve storage methods and manure management • Clear definition of practices and their boundaries in individual activities, • Ensuring "clarity" of activities for the farmer – what to do and for what amount.
---	--

Q1.3: What should be quality criteria for the EU Commission to evaluate ambition in the Member States' [your country's] Strategic Plans? (e.g. minimum requirements from MSs to ensure success of the Green Architecture as a whole)

• Does it respond to real country challenges? and takes into account regional differences (mountains, NATURA 2000, etc.) • Is the choice of instruments properly justified? • There are no "conflicts" of instruments or "overlapping" • The criteria at the EU level should be formulated fairly generally and be more precise at the national and regional level. For example: - limitations and adjustments resulting from climate change, e.g. reduction of greenhouse gas emissions from agriculture, increase in the level of organic matter in soil - resource protection (land, water, air), e.g. reduction of groundwater and groundwater pollution by nutrients (N and P) - protection of the landscape - ensuring biodiversity • Each proposed measure should address a specific – defined environmental problem identified in a given country. • Quantitative criteria should be crucial in assessing national strategy plans. • Does it meet the most important needs of the country and its regions and does it concern a sufficiently large number of farms?

Q1.4: Under which conditions could other CAP-instruments be considered as contributing to the Green Architecture? (E.g. Areas of Nature Constraints, investments, AKIS/consultancy, sectoral payments or DP (coupled/non-coupled) etc.)?

- Direct payments also indirectly support the achievement of environmental goals if enhanced conditionality is more ambitious than before.
- Greater degree of interconnection of instruments – other instruments should to a greater extent support farms with integrated, ecological or "environmentally friendly" production. It can be planned that in other AECM activities, the number of Eco-schemes implemented will give extra points or more support.
- The measures must be related – the number of farms with extensive grazing cannot be expected to increase if we do not provide investment opportunities – eligible costs for the purchase of livestock, construction of shelters, etc. This should be focused on problem areas.
- Other CAP instruments can be considered as supporting Green Architecture if they directly or indirectly contribute to the achievement of the environmental objectives (4-6) of the strategic plan.
- Examples of CAP instruments that can be included in "Green Architecture":
 - Support related to the production of legumes
 - In areas of particularly valuable nature, support for extensive production of cattle, sheep or goats (depending on the nature of the habitat)
 - Cooperation within the AKIS system (mainly related to science, consultancy and farmers) in the field of creating and implementing technical solutions enabling effective and profitable production while reducing industrial means of production
 - Consulting aimed at implementing techniques to improve soil quality
 - Support for investments in water retention,
 - Investments in fixed assets supporting environmental and climate protection, including investments in Natura 2000 areas
 - Investments in afforestation
 - Knowledge transfer / training for advisors

Q2: What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?

- Eco-schemes should reinforce the effects of the implementation of conditionality requirements and provide a step towards AECM, becoming an incentive to enter multi-annual commitments under the AECM program. - They should fit into the EU agriculture development strategy and not lead to the loss of the EU agricultural production potential. - They should not have an impact (indirectly) on reducing (elimination) of livestock production in the EU – especially cattle farming. - To achieve economies of scale – a wide offer of activities relatively simple to implement for a large number of farmers, - Should not require large additional expenditures. - Effects should be easily measurable. - The variety of practices within Eco-schemes so that the farmer has the opportunity to choose the most appropriate activities for his farm.	- Agriculture in Poland is rather extensive (compared to other EU countries), therefore "Eco-schemes" and other agri-environmental programs should not lead to extensification. They only match farmers practices contributing to the elimination of undesirable environmental effects. - The primary goal of Eco-schemes should be to improve soil quality and (subsequently) biodiversity. - Attractive payment rates – additional bonuses to be considered for repeating the action in the following years (the opposite suggestion was also made in the discussion – higher rate in the 1st year – <i>this is rather questionable [EM]</i>) - There is a popular stereotype in Poland (probably not only) that extensive, small scale farming is more friendly for the environment. It is not true in our opinion, especially if eco-efficiency indicators are compared. It should be taken into account when planning Eco-schemes and AECM that environmental performance can be improved in both – intensive and extensive types of farms.
---	---

What key factors and considerations should be made in ensuring the Eco-schemes are attractive (for MSs and farmers), effective, cost-efficient (in relation to the spent budget) and synergistic with AECM and other instruments? *(Please remember that measures should fit to an annual scheme and applying for an Eco-scheme is voluntary for farmers)*

a) In their design (e.g. how AECM or Eco-schemes should be designed/improved):

EU level	Poland
• A wide offer, enabling the selection of Eco-schemes most suitable for a specific farm; • More common nature of Eco-schemes; • A wide range of goals; • Relations between Eco-schemes and Agri-environmental programs (AECM) – "balanced" so that farmers do not withdraw from AECM to Eco-schemes; • Eco-schemes simple in definition, precisely defining the conditions, form and mode of verification of compliance with obligations resulting from Eco-schemes; • Provide resources for information dripping (educational films, publications, etc.).	• It is difficult to answer this question on such a general level – each instrument should be considered separately; • The problem of small farms – how to incentivize due to scale – farmers may find such subsidies a disincentive, perhaps a degressivity in setting the rates may be considered (higher rates to the specified area – "x" hectares, lowered behind this threshold). However, the opposite opinion was expressed in the discussion – "payments should be linear (not degressive). If someone implements good practices, why limit the support above an arbitrary decided area? " • Eco-schemes simple in definition, precisely defining the conditions, form and mode of verification of compliance with obligations resulting from Eco-schemes

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	Your Member State (/region)
• Strategic plans cannot be too ambitious because they will not be attractive and no one will be interested; • Perhaps flexible rates should be used in the case of low interest (for some instruments) • The rates should cover the fixed costs (related to the implementation of the instrument, e.g. depreciation, learning costs, ...) • Eco-schemes should be verifiable during the implementation control. • In subsequent years, on the basis of reports, the degree of interest of farmers in particular	• Problem: farmers can choose the easiest schemes, but a lot depends on the amount of support; • Eco-schemes should be verifiable during the implementation control. • "Administrative simplicity" – complicated bureaucratic procedures discourage farmers; • The ability to "build" Eco-schemes – an open list to which farmers and other stakeholders could add new proposals

elements should be examined. Assessment of environmental impact should be conducted.	
--	--

Specific questions

Q2.1: What are the pros and cons of a closed list-based approach (menu of options)?

Pros	Cons
• Simplicity of the system • A closed list of activities facilitates implementation / control • Clear rules known to all participants • A closed catalog of Eco-schemes is the only (?) solution enabling their operational implementation and control	• Limits differentiation and adaptation to local conditions (omitting practices that should be included due to the specificity of a given region) • A closed list, especially formulated at the EU level (common packages for all), will not solve many regional problems. • No flexibility • The closed catalog may not include all possible Eco-schemes to achieve environmental goals

Q2.2: If the EU and MSs choose on a menu option, what would you list as examples that should or should not be included? *(Please remember that measures should fit to an annual scheme and applying to an Eco-scheme is voluntary for farmers)*

a) Examples of concrete, potentially-effective/cost-efficient Eco-scheme options that should be included:

At EU level	In your MS / region	Why?
• Cultivation of nitrogen-fixing plants	• Cultivation of nitrogen-fixing plants • Widespread soil testing for nutrient content in order to enable proper nutrient balance	• Reducing amount of fertilizers and N-leaching • Fertilizing too much or too little due to non-compliance with the nutrient content of the soil in many farms • Reduction of NPK losses and environmental pressure due to excessive fertilization
• Application of crop rotation • Practices that promote the growth of organic matter in the soil and	• Application of crop rotation • Improvement of soil quality, enrichment in organic matter, liming	• Reducing pesticides use • Carbon sequestration • Large share of sandy, poor quality soils in Poland, relatively low content of

prevent wind and water erosion		organic matter, also a high share of acid soils • Production, economic and environmental conditions
• Subsidies for cattle fed in the summer period in the pasture system • Aid to animals kept in conditions of "increased" welfare	• Subsidies for cattle fed in the summer period in the pasture system • Aid to animals kept in conditions of "increased" welfare • Maintaining livestock production at a sustainable level	• Environmental, welfare and landscape advantages • Market needs (milk, meat) and the supply of organic fertilizers enriching the soil with organic matter
General comment Eco-schemes should take into account regional natural conditions and the existing environmental problem. Presentation of a reliable proposal of Eco-schemes will be possible after establishing the final shape of the conditionality requirements.		

Q2.3: What are the pros and cons of a top-up payment versus income foregone? What would you recommend and why?)

Pros	Cons
• Simplicity, easily seen as an incentive to participate, probably favors the universality of deployments.	• The risk of errors in estimates, • Different costs of the same activities depending on the specific farm conditions
• Top-up payments serve to redistribute the support. Thanks to this, they enable support for weaker but potentially developing farms.	• In some cases, a top-up system may result in a worse use of funds.

b) Examples of concrete, ineffective or problematic or cost-inefficient options that should not be included:

At EU level	In your MS / region	Why?
• Support for extensive grazing of cattle, sheep and goats	• Support for extensive grazing of cattle, sheep and goats	• This should be reserved for agri-environmental schemes⁶
•	• Intensive grazing of animals (high stocks especially in environmentally sensitive areas, e.g. LFA)	•
• Subsidies for the cultivation of winter catch crops – they exhaust water from the soil	• Subsidies for the cultivation of winter catch crops – they exhaust water from the soil	• More harm than good

Q2.4: How should Eco-schemes best be organized spatially, among themselves and with respect to AECM? Please consider: How can this be promoted by the EU and administrated by MSs? How to balance cost-efficiency of the measure (focus on hot spot) vs. Broad scale application?

- The offer of Eco-schemes is regionally diversified and complementary to AECM
- AECM more focused on specific Natura 2000 hotspots,
- Bonuses for farmers for group implementation of measures, especially in the case of linear elements of ecological infrastructure (e.g. potting bows, buffer zones along water courses)
- Actions must be linked to spatial policy. Positive effects will be visible if, for example, gaps in ecological corridors are bridged. This policy must be properly implemented at the local level.

⁶ Comment authors [GP]: most other workshops expressed a different opinion, namely that Eco-schemes should support extensification and/or effective management of low-input, extensively grazed permanent grasslands.

Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?

S.M.A.R.T.: “Specific, Measurable, Ambitious/attainable, Realistic, Time bound”

Note: The Biodiversity strategy requires a) 10% landscape features, b) expansion of organic farming to 25% UAA and c) reduction in pesticide (impacts) by 50%.

What key factors and considerations should be made by MSs when setting targets in their CAP strategic plans, and how should the EU guide and assess them?

EU level	Your Member State (/region)
Defining detailed goals and strategic plans at the level of the Member States is undoubtedly the right solution to take into account specific socio-economic and natural conditions. It seems, however, that more detailed EU-wide guidelines would be useful for establishing a certain minimum "ambition" in individual countries. Arrangements at EU level have advantages – they could be based on a better foundation (e.g. research in EU institutes, research projects funded by the EC), would facilitate linkage with objectives across the EU and would be uniform across all countries. Otherwise – the level of plans in individual countries may be very different and some may be considered not very ambitious. It would be advisable to define and communicate to the society key environmental problems (state of resources, ongoing processes) as well as social and economic It is also important to maintain a certain balance between economic and environmental goals, which the CAP has been trying to achieve over the years. We support the leadership of the European Union in activities for the protection of the natural environment, but we also emphasize the importance of activities for the economic sustainability of farms. In other parts of the world, economic objectives appear to have a clear priority, suggesting that there is still a	Effective implementation of national policies at lower levels of CAP management (e.g. regions) requires extensive social consultations and the inclusion of representatives of regions in the process of creating strategic plans, so that it is possible to properly adapt detailed solutions to the regional specificity. It would be advisable to define and communicate to the society the key environmental problems (state of resources, ongoing processes), as well as social and economic ones.

need in EU agriculture to increase the sector's competitiveness, including by supporting structural change. At both national and EU level, it is essential to find the right balance between environmental, economic and social goals. Excessively excessive goals of S.M.A.R.T. may be counterproductive, such as reducing the production of high-standard food in the EU while increasing exports from countries where environmental requirements are not respected. Specific issues that should be specifically addressed at EU level: - food security - agricultural population income - food safety - reducing the impact of agricultural production on climate change and mitigating the effects of climate change	Specific issues that should be specifically addressed at the national level (Poland): - labor efficiency and production profitability - food quality, adding value, - soil quality improvement; - water retention - strengthening of structural changes; - creating non-agricultural jobs in the countryside Taking into account the specific needs of regions in the dimension of e.g. environmental / climatic / social.
--	---

Specific questions:

Q3.1: What should count as “ambitious” targets? (how do you measure ambition?)

• The established goals should be ambitious, but at the same time technically and economically feasible, and not threatening food security. The measure of ambition may also be the measurement of the scope of achieving both the food supply objective and the reduction of environmental production costs. • According to one of the workshop participants: “The currently proposed goals are far too ambitious for most EU countries. The proposed level may refer to the EU average and should be higher for Member States with a predominance of industrial (intensive) agriculture, and lower for countries with less intensive agriculture. Thanks to this, it will also be possible to reduce disparities between the Member States ”. In addition, specific suggestions were made: • Achieving a clear progress in relation to the baseline, significantly increasing, measurable and lasting contribution to the improvement of, among others the state of the environment • Implementation of measures for the environment, animal welfare, food quality in as many farms as possible, as well as the implementation of as many measures as possible in individual farms • Achieving goals that have not been achieved so far
--

Q3.2: How should baselines be defined? (e.g. in terms of year, UAA/habitat cover etc.)

It is difficult to answer this question in an unambiguous and synthetic manner, as the definition of the baseline depends on the availability of data, the detail of measurements, and the specificity of phenomena (especially with regard to biodiversity objectives). The workshop participants made the following suggestions:

- If there are data from reliable databases, eg IACS, the last year before the implementation of the action can be considered the baseline;
- The base year should be the year preceding the introduction of individual measures in specific farms. In the case of Eco-schemes, it would be good to perform basic soil tests (N, P content of organic matter, sorption complex) and AECM to indicate the type of protected habitat.
- The baseline level should be the average for a given parameter over 5 years (2015-2020). The reduction indicators should be established on average for the EU and differentiated depending on the intensity of agriculture in a given Member State.
- If the characteristic for which the base year is determined shows fluctuations, the baseline level should be taken as the average value from 3-5 years;
- For features such as structure of arable lands, management of natural habitats – last year or the average of the 3 years before the start of the action. they are not systematically measured – for example biodiversity indicators, birds index, etc.
- Inventory taking may be considered, but a specific, very important problem should be pointed out – in the long run, it may be questionable to rely on too general indicators, such as those listed above, as their value is also influenced by other policies and phenomena (e.g. climate warming). CAP instruments may have a positive effect, but other phenomena will have a negative impact in a contrary.

At the level of implementations in single farms, environmental valuations may be considered. However, this would mean a significant complexity of the system, as well as high costs of valuation and monitoring of effects.

For some specific activities, however, it is possible to quite closely link the objectives and baselines – for example, assuming a specific share of arable land in the simplified farming system – X% per country, region.

Q3.3: What should the EU demand from your MS to clarify in its targets?)

- Defining the level of agricultural intensity and defining a roadmap for achieving the goals, which takes into account the economic and social viability of rural areas. It is crucial to make an objective assessment of the level of intensity and diversification of agriculture among the member states, based on uniform, simple criteria.
- Hierarchy of needs formulated in member countries and evidence (figures, maps, diagrams) on a national and / or regional scale;
- Listing of the main environmental problems along with their scale (e.g. region, country) and presenting a list of the most important remedial actions;
- Indication of compliance with key EU regulations, e.g. article 11. I strategies (Green Deal, Biodiversity Strategy, Farm2Fork);
- Identification of possible synergies and conflicts;
- List of indicators taking into account specific environmental conditions;
- The purpose of taking specific actions, the current state and the expected end state.

Q4: How can science contribute on indicators and the way they are used for performance evaluation of the CAP?)

Q4.1 How can landscape features be best mapped? (Impact indicator to be used in the next CAP. Needs to be up to date, detailed)? It is feasible in your country?

Indicator	Justification	For which MSs?
• Indicator of the number and frequency of occurrence of landscape elements. • Shannon or Herfindahl / Hirschman index • Relationship change indicator, e.g. :UR / forests / urban areas • Landscape mosaic, share of areas of high natural value	• The main value of the landscape is its diversity • Relative ease of computation, suitability for comparisons over time and space • As above • As above	• In all EU countries • In all EU countries • As above • As above

Q4.2 How can the methods for biodiversity indicators be improved, for the habitats and species of the Habitats Directive? (Impact indicator to be used in the next CAP). It is feasible in your country?

Indicator	Justification	For which MSs?
• Monitoring of data. • The use of drones by administrative units, satellite measurement, photomaps	• The objectivity of the prepared assessments increases with the increase in the amount of data collected in monitoring studies	• In all EU countries.

Q4.3 What are the best biodiversity indicators that can be proposed for the Complementary Result Indicator (FA 4A)?

Indicator	Justification	For which MSs?
• Landscape mosaic; • Share of individual groups of plants in the structure of UAA • Stocking of herbivorous animals on the TUZ	•	•

NOTE:

25% organic farming – unrealistic! Consumers do not expect and there will be no such demand⁷.

All activities will bring the current agriculture closer to organic production and will be integrated.

Food from organic production will not be as attractive as before.

The world needs food – cheaper – there must be quantity, and eco means less production.

⁷ Comment authors [GP]: see inputs from other workshops, the target is considered realistic in most MSs.

Reply Slovakia

Workshop facilitators: Peter Bezák (Institute of Landscape Ecology, Slovak Academy of Sciences), Jana Špulerová (Institute of Landscape Ecology, Slovak Academy of Sciences) et al.*

*People who participated at questionnaire survey or/and on online meeting that took place 19/10/2020:

Participants: Lucia Ďurcová (NGO BROZ), Martin Gális (Environmental Policy Institute), Dobromil Galvánek (Plant Science and Biodiversity Centre, Slovak Academy of Sciences), Luboš Halada (Institute of Landscape Ecology, Slovak Academy of Sciences), Katarína Hegedúsová (Plant Science and Biodiversity Centre, Slovak Academy of Sciences), Zita Izakovičová (Institute of Landscape Ecology, Slovak Academy of Sciences), Monika Janišová (Plant Science and Biodiversity Centre, Slovak Academy of Sciences), Mário Julíny (Agricultural Policy Institute), Katarína Klimová (NGO BROZ), Juraj Lieskovský (Institute of Landscape Ecology, Slovak Academy of Sciences), Pavol Littera (NGO BROZ), Katarína Mikulová (NGO BROZ), Marek Pihulič (Projektové služby s.r.o.), Jozef Ridzoň (Birdlife Slovakia), Zuzana Ružická (Ministry of Environment), Matej Smieško (Radela, s.r.o.), Samuel Súkenník (Ministry of Agriculture and Rural Development), Michal Sviček (National Agricultural and Food Centre), Ján Topercer (Comenius University, Botanical Garden), Libor Ulrych (State Nature Conservancy), Eva Viestová (Ministry of Environment), Hubert Žarnovičan (Comenius University, Faculty of Natural Sciences)

Those people contributed to this document by filling in the questionnaire or/and to discussion during the online meeting.

Workshop date: 19.10.2020

Used abbreviations:

AECM – agri-env-climate measures

MS – Member States

ECS – Eco-schemes

CO – enhanced conditionality

CAP – Common Agricultural Policy

GA – green architecture

Q1: How can the different Green-Architecture elements optimally complement each other? (What key factors and considerations

should be made in ensuring the Green Architecture operates best?)

GA – overall structure and functionality: key factors and considerations

- GA should reflect ideas of **integrated landscape management** in a way of combination of different GA schemes and their implementation in the landscape, considering all scales (temporal, spatial, institutional)
- Provide indicative **list of measures** per particular scheme and examples at level of farm/landscape and link to related targets and indicators (specific per country)
- Set up minimum requirements **per spatial scale** based on biodiversity and landscape status
- **Administrative requirements:** introduce stimulating measures, improve public awareness and promotion of a new measures, reduce administrative requirements for applicants, especially for small farmers, cooperation of regional agencies in administration, trainings and education for farmers, availability of best practises
- If CO is strengthened than ECS and AECM should request more demanding and specific results. CAP complying with all main biodiversity and landscape policies and strategies must be stated as the minimum requirement for its implementation.
- One of the basic measures towards nature conservation is to delineate **non-productive areas** as a part of UAA (excluding nitrogen fixing crop and catch crops)
- Strengthen spatial ecological stability of the landscape, secure natural landscape diversity in Europe, support valuable natural sites of national and international importance, i.e. biodiversity hot spots, ecological networks, spatial catalysts, patch dynamics and all ecological processes in agricultural landscape
- Conditions of ECS and AEM should address **regional demands**, e.g. if majority of certain area indicates low ratio of soil organic carbon then a new AECM must support farming management with aim to increase the carbon in soil of the respective area
- To more strictly and regularly check implementation of the GA measures at EU level and to **compare** reported results with **indicators on landscape and biodiversity** change in order to re-consider these measures in particular MSs, using for example model studies.
- Regularly evaluate **interests of farmers** to apply for particular measures of ECS and AECM and re-adjust conditions and allocated budget in case of their low interest
- To make ECS and AECM **financially attractive** for farmers, **administratively accessible, achievable on the field**, more tight to **ecological aims**, efficiently supervised and enforced; if payments for farmers are low then majority of farmers is not engaged and aims are not achieved
- To launch **stimulating payments**, i.e. stimulating for farmers, favourable for environment and climate; they can increase farmers motivation to apply management practices that are difficult to maintain, e.g. extensive grazing in protected areas or on steep slopes, difficult access sites

GA – overall focus of particular schemes – ECS, AECM, CO

- There is a good experience with some AECM measures like semi-natural grassland management which should be kept, while ECS should include simple measures like changes in dates of mowing, mosaic mowing, reducing size of blocks, creating buffer zones around wetlands

- Making **ECS simple** and thus to increase its **applicability and attractiveness** for majority of farmers and this way spreading a positive environmental impacts. **AECM** should aim to solve **specific problems** (target species, biotopes, protected areas, HNV areas), support result-based schemes and multifunctional measures at landscape level, allowing impact of one AECM measure to multiple problems
- Make CO use as the most efficient tool (based on the previous experience) how **basic and complex requirements for protection of natural resources** are accepted (protection of water, soil, biodiversity, etc.), which contributes to climate change adaptation
- Consider ECS as a basic and broad requirement to obtain subsidies and at the same time to contribute in maintaining / enhancing biodiversity and landscape-ecological stability

GA – conflicts, synergies, trade-offs

- to prioritise the major conflicts and trade-offs in management of agricultural landscape, for example increasing agricultural intensification vs. decreasing landscape heterogeneity, agricultural production vs. nature protection, urbanisation vs. rural development, etc.
- to improve **education of farmers and to raise awareness** on issues included in CO, which is not always understood by the farmers and thus often not respected unintentionally
- within CO to secure ecological landscape elements on grasslands, improve overall **supervision of CO scheme and its enforcement**, e.g. increase sanctions for breaking the law cases
- to define **explicit and quantifiable objectives** for GA schemes, to link these objectives with respective indicators in order to avoid conflicts and to maximise synergies, e.g. increasing population of species XY by yz% requires precise measures of ECS or/and AECM at defined area and within specified time frame
- improve adaptability of sectoral approaches towards GA development and green infrastructure, for example by applying existing or a **new overarching tools** for green infrastructure development
- there are conflicts coming from **land ownership** in Slovakia, e.g. when ecological elements, created by land user, are not accepted by land owner; in such case creating green elements only on publicly owned parcels is feasible, also by implementing land adjustment projects, or land left fallow as temporary solution
- based on EU regulatory frameworks the payments for AECM must be classified above the conditions of CO, ECS and **national regulatory frameworks**. However national legislation in Slovakia is sometimes very strict, although not always respected, which can cause problems in setting up AECM requirements
- GA measures are often perceived as limits in food self-sufficiency, without considering fact that food security is endangered by decrease of biodiversity and therefore synergies in finding the balance between both issues could be achieved in such cases
- up-date implementation of AECM should be reconsidered by applying precise assessment and **finding drivers of low interest** and subsequent adjustments should be performed; in some cases insufficient payment was the main reason of low applicability (e.g. support measure for bustard or ground squirrel) or improper conditions for the measure (green belts)

- creation of **long lasting green elements** within ECS is questionable since activities under this scheme are supported on yearly basis
- Inclusion of **wetlands into CO** can be inefficient if measures are not monitored in detail and sanctions are regularly applied – this is based on experience when wetlands were usually ploughed; considering this fact it would be more beneficial to include wetlands under ECS
- to include innovation and synergic measure: farm management implementing **best available science** and **best available practice** favourable for biodiversity and multifunctional use of agricultural landscape – demonstration farms, e.g. specific management reflecting ecological research in representative areas, management based on monitoring results in period 2014-2020, or based on experience from restoration of particular ecosystem by farming with positive impact on biodiversity, etc
- to include innovation and synergic measure: support cooperation of farms with **local initiatives and public**, for example in designing and approving farming management plans or use of citizen science in monitoring, etc.

GA – evaluation quality criteria (EU, SK)

- Assign **frameworks/principles at EU** level regarding ecological schemes in harmony with EU Biodiversity Strategy, Farm to Fork Strategy, e.g. % of resources to be assigned for ECS, % of the area for non-productive agricultural land; measurements for and analysis of schemes' effectiveness towards foreseen objectives per particular MS, examples of methodologies to select related indicators, for data collection, for creation of databases
- Allow **flexibility in setting** up of individual measures for MSs considering geographical, climatic and social differences and challenges
- Define **unified value of pesticides load** to soils or more values at level of biodiversity, water protection, etc.
- Proportion of **non-productive areas** registered in LPIS
- Assign the **minimum number of GA measures per spatial unit**, increase allocation of GA measures for the areas with **degraded ecosystems**
- **Ratio of GA elements** in whole managed land at the farm level, **average size of parcel**
- Establish the maximum **size of 20 ha per parcel**, large parcels to be divided by green infrastructure features with the minimum width of 6 meters, avoid ploughing green belts, motivate farmers to maintain **dispersed wood vegetation** on arable land and grasslands and include them in the subsidised areas
- Refer quantity and importance of **ecosystem services** provided by subsidised plots, which means to highlight other than production benefits from the farming
- Share and status of individual types of ecosystems in agricultural landscape
- To deal with the share of non-productive agricultural land **locally** due to significant differences in the country, for example share of non-productive plots is around 1% in many localities in the west part (e.g. SPA Ostrovné lúky), while the share in the eastern localities is about 10%, therefore it is impossible to define one value per country
- 25% of **organic farming** is common aim for EU, but particular target is defined for each MS; since actual rate is 9% for Slovakia reaching 25% seems unrealistic and ineffective, however intra-regional differences must be reflected

- Payments in nature protection areas should be conditioned by harmonisation of farming with **local requirements for nature conservation**, i.e. with management plans and other valid documentation of nature protection and of territorial system of ecological stability
- Share of subsidies for maintenance of **HNV type 2** – Agricultural mosaic landscape with low farming intensity and with natural and cultural values

GA – other instruments

- purpose built and useful **consultancy for farmers**, to be conducted by experts in environmental protection, e.g. by SNC SR, educated consultants, NGOs, etc., supported by raising public awareness of fact that protection of natural resources is not against the purpose to produce food but it is inevitable part of it
- cost-inefficient investments from the past should be aimed to **environment-oriented technologies** for agricultural production, e.g. purchase of equipment for managing species-rich grasslands, support of certified schemes to link production and biodiversity maintenance
- link other **available investments** with implementation of GA, e.g. farmers implementing measures to increase organic matter in soil can apply discount in purchasing equipment for its application
- support to **restore abandoned and overgrown meadows and pastures**, i.e. include these areas back to LPIS if there is no progressed succession by wood vegetation that would have structure of valuable shrub or tree biotope, e.g. the Carpathian oak-hornbeam forest or oak-linden forest
- improve conditions for **local production and consumption** and thus decrease ecological footprint of farming production
- re-allocate additional financial sources from **land adjustments** projects for CAP measures that aim for reducing size of arable land parcels, or for creation of non-productive agricultural areas

Q2: What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?

ECS – particular objectives

- support to create a new and maintain existing features of **green infrastructure**, especially in intensive agricultural landscape, e.g. water retention belts, green belts, trees corridors, dispersed wood vegetation
- **dividing plots of intensive farming** to smaller size parcels, e.g. up to 20 ha, by 6 meters width green belts, increase ecological stability, diversification of crops and of seeding procedures, support biotopes for pollinators, support agri-forest measures considering local conditions (location, water and soils conditions), support to orchards
- to be **linked with respective CAP's objectives**, for example if contribution is expected for target no.4 then the whole year soil cover or no tillage management should be secured
- the main focus should aim for **arable land** since there are more schemes available for grasslands

ECS – conditions, requirements

- ideally 50% of EU budget available, or at least 30%
- when green belts are created to divide large arable land blocks the payment per hectare should cover whole managed land of the farm, which would be around 20EUR/ha more compared to the recent direct payment scheme
- the minimum requirements are driven by CO and by the foreseen target under which ECS is proposed, e.g. for the aim of biodiversity maintenance/increase the measures can include creation of green belts or increase of farm/crop diversification

ECS – the pros and cons of a closed list-based approach

- farmers who are not experts in ecology can better understand and compare particular measures and to select those which are best fitting to their plans
- the need of their implementation, **availability to control**, compare, evaluate and coordinate
- they can be limited for specific areas or cases if they are not well defined, i.e. **low flexibility**

ECS/AECM – examples that should or should not be included

- no support to procedures like good agronomic practises, e.g. catch crops, or precise farming
- ECS should **not support nitrogen fixing crops or catch crops** as part of non-productive area

- avoid **large scale left fallow** land since they are source of weeds and invasive species; preference to fallow land in small plots, ideally in belts
- including multi-function edges of fields – **green belts in ECS**, to cancel requirements of their annual ploughing and seeding, not to bound its creation with certified seeds and to allow applying more types of flowering material, to support synergic effects of their locations for a sake of landscape connectivity
- Support traditional and multi-functional grassland management, i.e. **avoid mulching** that has degradation impacts and support further use of biomass like fodder or biofules of second generation, support grazing and increase of species composition, eliminate invasive species, etc.
- Assign **0.3 ha** as the minimum area for farmers implementing GA
- Assign **10% of UAA** to natural/semi-natural habitats in line with implementation of green infrastructure strategy and territorial system of ecological stability strategy
- Dividing arable land parcels by natural/semi-natural biotopes to maximum 50ha/30 ha blocks depending on their **potential erosion risk**
- Include **HNV type 2**- Agricultural mosaic landscape with low farming intensity and with natural and cultural values
- Do not exclude **dispersed wood vegetation** on subsidised pastures, contrariwise allocate higher amount for such pastures
- Do not include requirement of **mulching non-grazed parts**, or require mulching the maximum of the third of the area of pasture
- Regulate the amount of subsidy based on **spatial and temporal heterogeneity** in management, i.e. support mowing in different periods and in mosaic form, support different form of management (e.g. mowing, grazing, fallow land), while fallow land should not exceed ¼ of the area of parcel and should not last for longer than 2 years
- Allow better flexibility in **periods of mowing**, e.g. more time periods offered, indicator for start of mowing based on eco-climate conditions, etc.
- Stimulating measure: **support of extensive grazing**, including agri-forest measures, conditioned by the maximum number of animals per area, especially in NATURA2000 sites, regional biocorridors, edges of mountain forests and valleys, on areas with low soil quality, etc.
- Stimulating measure: **cooperation at the landscape level** (not at level of farm) when implementing GA measures to implement green infrastructure strategy, e.g. at catchment scale, at level of local actions groups
- Maintain and support **occasional wetlands** created naturally after heavy rainfalls
- Support no tillage management on suitable areas and support innovating seeding procedures
- Support generic scheme focused on **reducing intensive animal production**, which is the greatest source of GHG emissions in agriculture, e.g. stimulating measure to support applying natural manure to soil and thus increase organic soil matter, to improve animal welfare by expanding of extensive grazing, especially on areas that are recently mulched

ECS/AECM – spatial organisation

- to offer wide range of measures and to adapt to **regional/local differences**; ECS and AECM must reflect different conditions and demands of particular regions in Slovakia as well as farmers practices, land ownership, development of the landscape management and state of biodiversity; for example grasslands in the west Slovakia were transformed to arable land, which had negative impact on biotopes of many species, while different situation is in the east Slovakia where the priority would be to maintain recent management; similarly mountain and lowland areas should be distinguish in ECS measures or existing form of animal production, etc.
- AECM should aim for **protected areas and specific problems**, e.g. areas with wetlands on arable land or areas with higher share of non-forest wooded vegetation, areas where grazing restoration is needed, usually abandoned places of difficult access
- Implement AECM in multiple spatial, temporal and functional contexts, for example support diversity in context of **neighbouring parcels** (biotopes for pollinators, water retention belts, etc.); support agri-forest measures in context of historical landscape development and in context of natural conditions (water/soil conditions)

Reasons of the above mentioned suggestions and considerations

- Recently no correct data on use of **pesticides** exists since they offer information on quantity of individual products used, while information on amount of applied particular key ingredients is unknown and thus impact on environment cannot be precisely evaluated
- If ecological measures are not sufficiently supported the farmers perceive them only as non-productive areas and **lost income**
- The above mentioned suggested measures can be **tracked**/supervised and their potential positive impact is confirmed by various studies
- **Mowing** in early period makes difficulty to many species, the same as speedy mowing by modern machinery without dividing this activity to more phases. Shrinkage of grassland biotopes is one of the reasons for valuable species decrease and it is directly connected with extensive grazing and abandonment of rural areas. In some lowland NATURA2000 sites share of grassland in agricultural land is up to a few percentage.
- Based on the study of Institute of Environment Policy, which also uses remote sensing data analysis, Slovakia is the leading country in EU regarding the highest **average size of farming parcels** (https://www.minzp.sk/files/iep/2020_5_na_poliach_pusto.pdf). It is a result of merging small parcels to large blocks during communist collectivisation, but recently also due to the direct payments of the CAP, which motivated farmers to farm large blocks of land. As a consequence the potential erosion risk has increased on arable land blocks (44% of agri land is under water erosion risk, 6% under wind erosion risk), similarly agri land is predisposed to drought, heating effects, floods. Therefore, large arable land parcels need to be cut by green infrastructure to provide regulating and cultural services. Based on the study of Kapička et al. (2017) the costs for the farming of large blocks decrease along with the size of blocks up to 40-60 ha. The respective measure proposes decrease of the size of parcels to 30-50 ha depending on erosion risk, which comes from the regulative STN 75 4501 and which is described at the

following link:

<http://www.podnemapy.sk/portal/verejnost/konsolidacia/konsolidacia.aspx>

- In many regions the area of **non-productive parcels** of agri land is very low, which leads to biodiversity loss. Therefore it is important to cut large parcels by non-productive areas otherwise there would not be positive impact on biodiversity, i.e. there would not be significant effect on biodiversity if productive parcel is divided to smaller parcels by growing different crop
- Grassland **mulching** has expanded in Slovakia only due to subsidy system (direct payments) that allows this single farming activity while its negative effects on species diversity and biotopes heterogeneity are well known (e.g. Bernátová et al. 2018)
- ECS measure to restore **grassland on arable land** cannot be implemented equally on the whole area of Slovakia, since most of the support would be consumed by regions with higher share of grasslands
- **Diversity** supports diversity – management diversity supports biological diversity in the landscape, landscape structure diversity supports its species diversity. Each feature of GA has an importance as single element, but mainly in interaction with other elements, e.g. existence of one tree on homogenous meadow without any other wood vegetation can condition existence of fungi linked to this tree, microorganisms, etc. which cause other subsequent ecological effects.
- **Amount of payments** for several green measures was inefficient in the previous scheme. For example the support for bustard species was set up as 351 EUR per ha outside the area of Žitný ostrov, however in order to attract farmers for this scheme the payment at least 400-600 EUR/ha would be needed. At the same time **conditions** for AECM measures cannot be too demanding for farmers. Good example is creation of green belt with requirement to use certified seeds, which is difficult to obtain, and to plough the green belt annually, which is ineffective for biodiversity.

Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?

S.M.A.R.T.: “Specific, Measurable, Ambitious/attainable, Realistic, Time bound”

What key factors and considerations should be made by MSs when setting targets in their CAP strategic plans, and how should the EU guide and assess them?

EU level

The EU should clearly take into account the Habitats Directive, the Birds Directive as well as Biodiversity Strategy for 2030, EU Green Deal, the Water Framework Directive, the Nitrates Directive, the Directive on Sustainable Use of Pesticides, European Landscape Convention and other related EU legal documents. Using clear, measurable and realistic indicators the CAP should meet the above mentioned strategies. The CAP operates with a huge part of EU budget and it is probably the most powerful and complex tool for landscape management. Therefore the CAP cannot be ineffective or even counterproductive in the light of these directives.

Other key factors and considerations:

- The EC should take into account the differences among the MSs and to apply context indicators, to set individual targets to each MS, depending on the context of the country (e.g. pesticide use in Slovakia is relatively low compared to western EU countries).
- As for general targets to insist on mandatory allocation of 30% for Eco-schemes and to delimit at least 10% of the agricultural area as non-productive areas (not including nitrogen fixing crops and catch crops).

SK level

General EU targets to be applied in Slovakia have to take into account national contexts and must focus on systematic issues that have been causing habitat degradation and biodiversity loss (like abandonment of pastures due to decrease of animal production, decrease of grazing due to intensification, different share and composition of green/blue infrastructure in lowlands from west to east Slovakia and related landscape diversity).

Key factors and considerations:

- Take into account the objectives set in the Priority Action Framework 2021-2027 (PAF) for Financing Natura 2000 in Slovakia which includes detailed list of measures and their costs that should be integrated in a design of the CAP. For example these measures aim to achieve favourable conservation status of habitats of EU importance dependent on grazing (e.g. *1340, 1530, 6120, 6210, 6230, 6240, 6250, 6260) or taking into account the measures to protect bird species of the agricultural landscape (*Perdix perdix*, *Coturnix coturnix*, *Crex crex*, *Vanellus vanellus*, etc.).
- To protect water bodies and wetlands from fertilizers run-off in accordance with the Water Framework Directive, Nitrates Directive and Directive on Sustainable Use of Pesticides by e.g. buffer strips and other green infrastructure along watercourses or wetlands, either when they are missing or they are insufficient. Support from a public sources must be linked to compliance with the law (primarily the Water Act) – based on an evidence from floods reporting the farming activities are not respecting this law in many cases. Key factor is to introduce controls on compliance with the law and with established obligations for farmers and to apply sanctions for non-compliance with the law on regular basis.
- To improve the condition of livestock production by improving animal welfare (increase outdoor access and free range and decrease stabling). By expanding extensive grazing many abandoned and overgrown localities can be restored, however the stage and rate of secondary succession should be considered in respect to local conditions, habitat type, shrub or tree species and predicted restoration costs.
- To increase the landscape diversity and ecological stability of the landscape by increasing the diversity of crops and elements of green architecture.
- To balance the trade-offs between biodiversity conservation and an economic growth of agriculture by defining cost-efficient and at the same time biodiversity enhancing measures. For example reaching target of 25% UAA in organic farming can be achieved, but if this concerns mainly grasslands then reaching this target would

become inefficient, i.e. there is not a big difference in management of upland grasslands under organic farming and under conventional farming.

- To start systematic recording of all agricultural activities at the farm level. Subsequently, it is necessary to set up a mix of measures and schemes that support for example agricultural activities aimed at reducing CO₂ emissions. Otherwise it is difficult to make the right decisions without correct and detailed input information. Precise data collection can help better quantify key indicators and thus better assess the effects of supported farming interventions, including re-evaluation of green measures in respect to their impact towards foreseen environmental objectives.
- To develop systematic, precise and flexible monitoring of each Eco-scheme measure. If the particular scheme does not deliver the expected results within a given time frame, this should lead to an adjustment of the scheme. Use of modern technologies in monitoring, which are underused in Slovakia, is necessary – satellite images (Sentinel), "geotagged" photographs, etc. Finally, regular monitoring reporting of implementation of the schemes and their impacts should be timely and transparent, i.e. open to wider audience.

Q3.1: What should count as “ambitious” targets? (how do you measure ambition?)

Ambition should be estimated through the output/result indicators, i.e. difference between baseline and target state. Roughly, if the present state is improved by 50% it can be considered as a highly ambitious target.

- It is important to set a correct baseline and measurable indicators for targets that correspond with enhanced biodiversity, e.g. to improve conservation status to favourable at minimum of 25% of the area by elimination of threats pressures or inappropriate management (e.g. absence of grazing, too intensive management, etc.)
- To halt decline of common bird species and to improve condition for nesting of some regionally extinct birds species (*Otis tarda*, *Limosa limosa*, *Coracias garrulus*) where their return is likely. There is a risk that some of these species do not return during the programming period even if habitats are restored. Therefore the ambition should be measured also by the trends in abundances of other species associated with the same habitat.
- To set sufficiently high targets for increasing the landscape diversity, for example by increasing of the crops diversity, supporting growing vegetables and fruits, reducing the average size of plots through separating large blocks by green infrastructure to achieve maximum size of 20-30 ha per block.

Q3.2: How should baselines be defined? (e.g. in terms of year, UAA/habitat cover etc.)

To define baselines, it is appropriate to use monitoring data obtained according to Art. 17 of Habitats Directive. The Slovak Republic has a relatively well-developed monitoring of species and habitats on permanent plots throughout the country. This data may be used to set and monitor the implementation of the CAP objectives. Examples:

- The area and conservation status of non-forest habitats and species, e.g. the area of habitat *6210 in the Slovakia, % of the area with status as favourable, % as U1, % as U2, etc.
- Share of green architecture elements, share of natural, semi-natural and artificial ecosystems, including grasslands, share of area threatened by invasive species, share of soils degraded by erosion, etc.
- annual changes/increase in grassland area (all together, i.e. not only species-rich habitats)
- five-years changes of FarmLandBird Index
- the area of organic farming (including an arable land, the area of vegetable production and permanent crops)
- the area of natural and near-natural forest including habitats of several target species (e.g., flagship *Tetrao urogallus*); a high priority is to develop scheme to support these habitats, as conservation of natural forests is one of the key aims of EU Biodiversity Strategy and EU Climate Adaptation Strategy.
- Share of road less area in forest and non-forest ecosystems, which is irreplaceable in maintaining landscape connectivity, resisting fragmentation and biotic invasions.

Q3.3: What should the EU demand from your MS to clarify in its targets?

- The EU should align the CAP objectives and measures with all relevant EU directives and strategies and request from the MSs to implement the Biodiversity Strategy through the CAP measures. It would also be beneficial to set up a working group composed of the ministers of agriculture and environment, including representatives of NGOs, scientists and other experts.
- It is necessary to set obligatory criteria and limits, ensure consistent control and following to this to make funding for the MSs conditional. In case of the Slovak Republic it is recommended to involve the State Nature Conservancy of the Slovak Republic (SNC SR) in checking the implementation of the green architecture measures, or at least the selected measures in general and complete implementation in protected areas. In such case it is necessary to strengthen legal and personal capacities for the supervision in the field.
- Using best available science and practices MSs have to clearly justify the biodiversity issues that need to be addressed by the proposed Eco-schemes, i.e. to define the most important habitats and species for conservation, efficient management measures to improve their conservation status and sufficiently stimulating payments.
- MSs have to establish data collection system for Complementary Result Indicators that could help to quantify the net effects of interventions per foreseen target (e.g. GHG emissions, ammonia, carbon sequestration, etc.). Using this data, it would also be possible to regularly update conditions of the Eco-schemes during the programming period and to provide a fact sheet to the farmers, decision-makers and public.
- Public support to farmers should also be linked with the obligation to report data on cultivated crops and their further use (in a reasonable and simple format). Data on the use of individual crops for different purposes are not available and thus it is not possible to clearly assess whether the cultivation of the particular crop is necessary or useful. The suggested categories are: food production, livestock breeding and energy use.

Q4: How can science contribute on indicators and the way they are used for performance evaluation of the CAP?

Q4.1 How can landscape features be best mapped? (Impact indicator to be used in the next CAP. Needs to be up to date, detailed)? It is feasible in your country?

Landscape features as part of Land Parcel Identification System (LPIS):

- To use combination of LPIS, remote sensing, drones and field survey and possibly using existing databases (also based on farmers' requests).
- It is appropriate to use 3D images LIDAR, which help to determine the area and other parameters of landscape features.
- To include landscape features outside LPIS, like green elements on the edge of production parcels or periodic wetlands on arable land, which increase impact of green architecture (e.g. riparian vegetation, wetlands, windbreaks, etc.)
- Create a vector layer of a new green/blue features mentioned above and link it with the related green architecture schemes.
- Create layers of specific and degraded areas of agricultural land (e.g. areas with high erosion risk, abandoned agricultural areas)

Q4.2 How can the methods for biodiversity indicators be improved, for the habitats and species of the Habitats Directive? (Impact indicator to be used in the next CAP). It is feasible in your country?

- FarmLandBird: The current methodology is satisfactory in general, however including more observation points covering all focused areas would be beneficial. It would be useful to extend monitoring network by areas with Eco-schemes and specifically evaluate impact of Eco-schemes on FBI. Today, the indicator is calculated only at the national level and for AECM areas.
- HNV: Currently, only the area of HNV1 (semi-natural grassland habitats) and HNV3 (habitats for the protection of bustard and ground squirrel) are delineated and included in the LPIS. There are no measures to support HNV2 „Farmland dominated by a mosaic of cultivated land and small-scale features“ – to create respective layer in LPIS and link with the related green architecture measure.
- Habitat conservation status according Art. 17 of Habitat directive – Current conservation status of habitats, monitored by the State Nature Conservancy of the Slovak Republic, would be useful for the assessment of biodiversity of agricultural land. The assessment of habitat conservation status is based on the species composition, including indicator species, expansion of invasive species and other threats. At present, only the state of habitats at the national level is assessed. It would be appropriate to link the results of habitat monitoring with spatial data of the LPIS. Based on that, distribution of each habitat can be displayed in the LPIS layer and thus visible for farmers too. This assessment can help to assess the impact of the current management or the effectiveness of the existing measures.

Q4.3 What are the best biodiversity indicators that can be proposed for the Complementary Result Indicator (FA 4A)?

- Number of species – indicator of species richness for grassland. Indicator of species richness could be assessed for each habitat of Habitats Directive separately, using existing vegetation databases and results from ongoing regular biotope monitoring. Based on the average number of species, an interval for each grassland habitat type is defined: excellent, good, average, disturbed species richness of habitats. Such evaluation could be connected with the amount of the support allocated.
- Conservation status of grassland habitats linked to agricultural use – code according to the Habitats Directive): * 1340 * 1530 * 2340 * 6120 * 6210 * 6230 * 6240 * 6250 * 6260 6510, 6520, 4030, 40A0 – Impact of management on conservation status of grassland habitats (Art.17 Habitat directive – see also above under Q4.2)
- Conservation status of selected plant and animal species dependent on agriculture (e.g. butterflies or other selected pollinators) – Impact of management on conservation status of selected plant and animal species (Art.17 Habitat directive) – to select representative species.

Bird species characteristic for habitats:

- extensive pastures (*Lanius collurio*, *Lanius minor*),
- meadows (*Crex crex*, *Coturnix coturnix*)
- Wetlands (*Vanellus vanellus*, *Tringa totanus*)
- Mosaic field landscape (*Perdix perdix*, *Otis tarda*)
- Field wetlands (*Bombina bombina*)

Due to unavailability of continuous series of data at sufficient spatial level, it is not realistic to measure changes in the species population apart from birds which are covered by the Farm Land Bird index. However periodical monitoring and assessment of some selected species should be launched in the long-term.

- Status of animal species in running waters of the agricultural landscape, which means using water-related indicators in assessing impact of agricultural activities (N, P and other nutrient loads, biocides, fine-earth flushes, etc.), in particular some macrozoobenthos groups such as EPT – percentage of taxa of these orders in the group, B / H index – the ratio of the number of individuals of the *Baetidae* family to the number of individuals of the *Heptageniidae* family), or fish (Slovak ichthyological index) or multimetric index according to the Water Framework Directive.
- Threats by invasive species – share of non-productive areas covered by invasive species
- Indicators of landscape diversity, including Diversity of crop; Landscape composition; Indices of landscape diversity – Patch density (PD); Area size indices; Index of natural/semi-natural areas fragmentation, Proportion of HNV areas, Index of ecological stability; Index of total landscape changes – to be used as the impact assessment of green architecture schemes.
- CO₂ production – The EC, in cooperation with the JRC, prepares CO₂eq production coefficients for dozens of agricultural activities at farm level based on the evaluation of published results for particular agricultural activities (e.g. type of stabling, animal diet composition, manure application method, manure storage method, type of ploughing, seeding, etc.). Once the results are made available to MSs, they will be able to focus their policies on agricultural activities that will reduce CO₂eq emissions.

- The amount of carbon stored in soil or in grassland ecosystems, in order to capture changes and increase this amount at the end.
- The value of ecosystem services per spatial unit – apply evaluation of ecosystem services in agricultural landscape once the methodology is finalised and approved by the Ministry of Environment (e.g. reflecting MAES which is obligatory for MSs)

Reply Slovenia

Workshop facilitators: Ilona Rac, Tanja Šumrada

Participants:

Workshop 1 (Questions 1 and 2): Andreja Beci (Biotechnical faculty), Danilo Bevk (National Biology Institute), Andrej Bibič (Ministry of environment), Blaž Blažič (BirdLife Slovenia), Jelka Brdnik, Tatjana Čelik, Jure Čuš, Jernej Demšar, Katarina Denac, Marjan Dremelj, Jože Ileršič, Damjana Iljaš, Alenka Ivačič (Slovenian agricultural paying agency), Tončka Jesenko, Mitja Kaligarič (Faculty of Natural Sciences and Mathematics), Nino Kirbiš, Nataša Kopušar, Nastja Kosor, Silvester Kranjec, Primož Marolt, Barbara Medved-Cvikl, Boštjan Petelinc (Ministry of agriculture), Mojca Podletnik (Landscape Park), Ksenja Podpečan, Miša Pušenjak, Marko Puškarič, Urban Šilc, Matjaž Tratnik, Andrej Vodopivec, Jože Vončina, Brane Vreš (Slovenian academy of science and arts), Jana Vrhovnik (Local (Kranj) office of agricultural chamber), Barbara Zagorc (Agricultural Institute), Barbara Zakšek (Center for Cartography of Flora and Fauna), Maja Žibert, Mateja Žvikart (Slovenian Institute of Nature Protection)

Workshop 2 (Question 3): Andreja Beci, Maja Bevc, Danilo Bevk, Blaž Blažič, Petra Božič, Jelka Brdnik, Marko Čampa, Tatjana Čelik, Maja Cipot, Jure Čuš, Nika Debeljak, Katarina Denac, Klemen Eler, Emil Erjavec, Petra Gombač, Matjaž Grkman, Veno Grujič, Damjana Iljaš, Alenka Ivačič, Anton Jagodic, Vasja Juretič, Urban Kalan, Mitja Kaligarič, Jernej Kavšek, Nino Kirbiš, Dominika Klavž, Nataša Kopušar, Nastja Kosor, Silvester Kranjec, Filip Kuzmič, Nika Lesjak, Nina Lozej, Barbara Medved-Cvikl, Rok Mihelič, Ana Novak, Boštjan Petelinc, Tatjana Pevec, Mojca Podletnik, Aleš Praček, Marko Puškarič, Ilona Rac, Janko Rode, Urban Šilc, Sonja Škornik, Jasmina Slatnar, Mateja Strgulec, Tanja Šumrada, Tine Sušek, Matjaž Tratnik, Ida Turinek Jelenko, Andrej Udovč, Andrej Vodopivec, Jožica Vodopivec Rozman (Central Office of Agricultural Chamber), Brane Vreš, Jana Vrhovnik, Draga Zadravec, Barbara Zagorc, Barbara Zakšek, Maja Žibert, Mateja Žvikart

Workshop 3 (Question 4): Andreja Beci, Danilo Bevk, Jelka Brdnik, Ana Čebin (Agricultural Institute, Section for Ecology and Natural Resources), Tatjana Čelik, Jure Čuš, Nika Debeljak, Katarina Denac, Marjan Dremelj, Emil Erjavec, Petra Gombač, Zvonko Hardi, Vida Hočevar, Damjana Iljaš, Alenka Ivačič, Peter Kastelic, Nino Kirbiš, Dominika Klavž, Nataša Kopušar, Nastja Kosor, Silvester Kranjec, Katarina Kresnik, Filip Kuzmič, Ana Novak, Zoran Planko, Mojca Podletnik, Simon Poljanšek, Ilona Rac, Adam Raspor, Janko Rode, Mateja Strgulec, Klavdija Strmšek, Urban Šilc, Iris Škerbot, Suzana Škof, Tanja Šumrada, Matjaž Tratnik, Barbara Trunkelj, Ida Turinek Jelenko, Andrej Udovč, Jožica Vodopivec Rozman, Jože Vončina, Brane Vreš, Jana Vrhovnik, Barbara Zagorc, Barbara Zakšek

Workshop dates: 11., 19. and 25.11.2020

Q1: How can the different Green-Architecture elements optimally complement each other?

What key factors and considerations should be made in ensuring the Green Architecture operates best?

a) In its design (e.g. how AECM or Eco-schemes should be designed/funds allocated/improved)?

EU level	Slovenia
- More clear definition and ambitious GAEC rules	- Clearly differentiate between baseline and above-standard measures - above-standard measures should have attractive payments to be economically interesting - Improve targeting of ecologically important areas/elements - Provide investment support for restoration of landscape features where sensible and necessary

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	Slovenia
	- Sufficient support to knowledge transfer, monitoring schemes and evaluation, including for training new staff

Specific questions:

Q1.1: What type of measures should each Green-Architecture instrument focus at from an environmental perspective?

Instrument	Should cover...
AECM	Targeted and more complex schemes that should include commitments exceeding one year.
Eco-schemes	- % landscape features above GAEC standard, - established certification schemes and comprehensive farming systems (as opposed to land under conversion, e.g. Organic farming and Conservation tillage),

	- simple biodiversity measures that can be applied annually
Enhanced Conditionality	GAEC 9: Share of non-productive land (e.g. fallow land and flower strips) and landscape features on all types of agricultural land, GAEC 10: Ban on converting permanent grassland in Natura 2000 should be expanded since it is currently implemented only in some Natura 2000 sites. No exceptions should be allowed for organic and small farmers. It should also include an upper limit on fertilization and stocking rates. Minimum requirements on shrub encroachment in certain areas should be applied as well. GAEC 2: Definition of wetlands might be challenging at the national level. It should include fens, peatlands, wet meadows and some types of small water bodies (e.g. local depressions).

Q1.2: Which conflicts between instruments, that you are aware of, can be resolved in the new Green Architecture and how? (at EU level or in your country)

Problem	Solution
- Find balance between conditionality as basic standard and above-standard measures - Coordinate implementation of measures in terms of their spatial allocation, especially specific measures with contradicting demands.	- political but also scientific issue (knowledge about systems' tipping points); more knowledge is needed, but in its absence, apply precautionary principle

Q1.3: What should be quality criteria for the EU Commission to evaluate ambition in the Member States' [your country's] Strategic Plans? (e.g. minimum requirements from MSs to ensure success of the Green Architecture as a whole)

- Contribution to the achievement of goals in the EU strategic documents, international commitments (e.g. CBD, Ramsar convention) and implementation of Bird and Habitat Directives
- Contribution to reversing the biodiversity declines and improving the conservation statuses of Natura 2000 species and habitat types as measured within the current monitoring schemes.
- Declaring the minimum required share of UAA as non-productive elements; disallow or penalise (weighting factors) any semi-productive areas such as nitrogen-fixing plants.

Q1.4: Under which conditions could other CAP-instruments be considered as contributing to the Green Architecture? (E.g. Areas of Nature Constraints, investments, AKIS/consultancy, sectoral payments or DP (coupled/non-coupled) etc.)?

Natura 2000 payments are an important instrument that should be targeted to the most sensitive habitat types where voluntary measures are insufficient. The regime should be adapted to the specific demands of the habitats and go beyond simply setting general limitations (e.g. no fertilisation).

Non-productive investment – conservational projects to restore and newly set-up landscape features, which must then be tied to further above-standard schemes that the farmer can enter into, or take them into account for the needs of conditionality.

Other investment: lower weighting factors for support to purchase of minimal tillage and other types of specialised machinery if it is included in Eco-scheme and new land is entered.

Knowledge transfer and cooperation are important supportive measures, so a suitable share of funds, which covers targeted projects and activities, could be considered as well. Knowledge transfer is important for awareness-raising and competencies, but the system should be upgraded to include more individual approaches and learning in smaller groups of farmers, and a greater emphasis should be put on practical training and sharing of good practices on-site. The cooperation measure is an important instrument for piloting new conservation measures, especially if they include more complex ways of organising, (e.g. several institutions).

Support measures to implement complex biodiversity schemes and CAP technical support are important, too. Support measures are needed for very targeted biodiversity schemes, where they enable the functioning of different organisations engaged in cooperating or contracting with farmers, as well as substantive control (e.g. co-financing the work of field ornithologists who determine territories or nest-sites and then inform farmers about this). Technical support to the implementation of the strategic plan must include sufficient funds for adequate monitoring and evaluation of measures. This is also crucial for ensuring adequate data bases for implementing result-oriented and spatially targeted biodiversity schemes.

Q2: What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?

One of the key drawbacks for including biodiversity measures in the Eco-schemes is their yearly implementation. This means that they are less suitable for measures that aim to improve or restore current ecological conditions, because suitable management should usually be applied for several years. They may be sensible for certain species, e.g. birds nesting in fields whose nests move every year, or for pollinators (flower strips). At least in Slovenia, Eco-schemes might also be less suitable for measures that should be implemented early in the year, because most farmers will probably apply them in April or May, when they usually apply for CAP income support.

What key factors and considerations should be made in ensuring the Eco-schemes are attractive (for MSs and farmers), effective, cost-efficient (in relation to the spent budget) and synergistic with AEEM and other instruments? *(Please remember that measures should fit to an annual scheme and applying for an Eco-scheme is voluntary for farmers)*

(no reply)

Specific questions:

Q2.1: What are the pros and cons of a closed list-based approach (menu of options)?

(no reply)

Q2.2: If the EU and MSs choose on a menu option, what would you list as examples that should or should not be included? *(Please remember that measures should fit to an annual scheme and applying to an Eco-scheme is voluntary for farmers)*

a) Examples of concrete, potentially-effective/cost-efficient Eco-scheme options that should be included:

At EU level	In your MS / region	Why?
	Share of non-productive land and landscape features on farm holding's UAA, which exceeds the baseline defined in GAEC 9.	If e.g. 10 % of UAA should include non-productive features, as recommended in some papers, farm holdings that are willing to dedicate additional land exceeding that percentage could be compensated via Eco-schemes.

	Reduction in grassland fertilization and leaving part of the meadow unmown	
	Measures targeting bird species, which nest on arable land (e.g. lapwings and skylarks)	Implementation of such measures is usually connected to crop rotation and the location of nests in each breeding season, so one-year contracts might be a suitable solution.
	Organic farming Conservation agriculture	Farming systems that include a clear set of principles or certification should be applied within Pillar I. Conservation tillage works best over time, so long-term commitments are best for permanent results in terms of soil quality; however, there are also short-term benefits (reduced fertilisation, water retention, erosion prevention, carbon sequestration) that support considering short-term inclusion as an option, with possible annual top-ups to stimulate staying in the scheme, which could be simple to implement.
	Flower strips	

b) Examples of concrete, ineffective or problematic or cost-inefficient options that should not be included:

At EU level	In your MS / region	Why?
	Measures on arable land and grasslands with low standards and weak or unclear impacts on biodiversity.	

Q2.3: What are the pros and cons of a top-up payment versus income foregone? What would you recommend and why?

Pros	Cons
In some areas payment calculations that are based only on income foregone result in low payment levels, so these measures are not competitive enough.	Sensitive to lobbying; danger of coupling high payments with low standards to increase uptake

Q2.4: How should Eco-schemes best be organized spatially, among themselves and with respect to AECM? *Please consider: How can this be promoted by the EU and administrated by MSs? How to balance cost-efficiency of the measure (focus on hot spot) vs. Broad scale application?*

Definition of eligible areas for different Eco-schemes and AECM was identified as one of the important challenges of the current policy planning. In principle, priority should be given to targeted measures, which are usually implemented on limited areas, over horizontal measures with broad-scale application. It should also be ensured that horizontal measures do not “compete” with targeted measures, so there should not be overlaps in the eligible areas.

In Slovenia, there is a tendency that biodiversity measures are implemented with increasing level of spatial targeting, whereas this approach is much less evident in the case of more technological schemes targeting water and soil protection, which are usually more horizontal. As regards horizontal measures, the EU should require that the MSs justify their implementation on the available data, since broad-scale (i.e. country-wide) application of measures is only justified in a very limited number of cases.

Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?

S.M.A.R.T.: “Specific, Measurable, Ambitious/attainable, Realistic, Time bound”

Note: The Biodiversity strategy requires a) 10% landscape features, b) expansion of organic farming to 25% UAA and c) reduction in pesticide (impacts) by 50%.

What key factors and considerations should be made by MSs when setting targets in their CAP strategic plans, and how should the EU guide and assess them?

(no reply)

Specific questions:

Q3.1: What should count as “ambitious” targets? (how do you measure ambition?)

Targets should be measurable, time-bound and clearly linked to indicators. The targets should also be derived from the data analysis and identified needs. This is a prerequisite for measuring “ambition”, which should be defined in comparison to the current state of biodiversity and based on expert opinion of local biodiversity experts.

Targets should primarily be based on context indicators, which can be assessed annually (e.g. farmland bird index) or periodically (e.g. share of Natura 2000 species and habitat types in favourable condition). These should be then complemented with targets which are more directly linked to the policy implementation (e.g. share of UAA in the biodiversity measures and share of landscape features and other non-productive elements per UAA per farm holding). However, one of the main problems is that only certain indicators (e.g. share of UAA in AEM) will be subject to mid-term and final evaluation, whereas others will only be evaluated at the end of the programming period.

Q3.2: How should baselines be defined? (e.g. in terms of year, UAA/habitat cover etc.)

This question was not discussed in detail during the workshops. The ministry representatives indicated that the baseline will probably be set to the beginning of the new programming period. This might be appropriate for the targets connected to policy implementation. However, for targets linked to the context indicators, a longer time period should be taken into account. For the new Member States, the EU accession could represent a suitable time frame (i.e. 2004 in the case of Slovenia), because this date marks the beginning of both the CAP and the EU’s nature conservation policy implementation at the national level.

Q3.3: What should the EU demand from your MS to clarify in its targets?

The EU should demand a clear link between the CAP targets at the MS level and goals of the EU strategies and nature conservation legislation (i.e. Bird and Habitat Directives) as well as PAFs and Natura 2000 management plans. MSs' targets should indicate how the policy will enable the reaching of goals in the documents and legislation listed above. MSs should provide proof of domestic expert consultation supporting CAP targets.

Q4: How can science contribute on indicators and the way they are used for performance evaluation of the CAP?

Note that the CAP comprises Output, Result and Impact indicators and in the next period also Complementary Result Indicators (CRI). Annexes are closed but a) methods can be improved and b) the CRI requires indicators for biodiversity.

Specific questions:

Q4.1 How can landscape features be best mapped? (Impact indicator to be used in the next CAP. Needs to be up to date, detailed)? It is feasible in your country?

In Slovenia, a project was carried out on the potential of remote sensing technologies and machine learning for identifying landscape features. The results suggest that some landscape features (particularly woody and linear elements, like hedgerows) can be detected at a sufficient level of detail, so a common spatial layer of such features could be prepared at the national level. However, the suitable data is not available yearly, but only in certain time periods. Furthermore, some landscape features are not easily detectable with this approach (e.g. water objects under canopy and landscape features in areas with increasing shrub encroachment). Therefore, a combination of both remote sensing data and the expanding of the current system, including LPIS, was suggested. The latter would mean that the farmers are obliged to identify and apply certain non-productive features by themselves in order for them to be eligible for the CAP income support as part of the new system of Conditionality.

Q4.2 How can the methods for biodiversity indicators be improved, for the habitats and species of the Habitats Directive? (Impact indicator to be used in the next CAP). It is feasible in your country?

One of the key drawbacks for establishing more targeted biodiversity indicators is that most monitoring systems have not been implemented at a sufficient scale or have not yet been developed at all. In Slovenia, the current biodiversity monitoring schemes include: Farmland Bird Monitoring scheme (since 2008) and monitoring of some bird and butterfly species in certain Natura 2000 sites (mostly since 2004 or 2008). A butterfly monitoring scheme has been implemented since 2007, but only on a voluntary basis, so there are too few sampling plots to enable the calculation of an index at the national level. Currently, a research project is underway which aims to establish a national monitoring scheme for pollinators. Financing and staffing problems are important for this issue (see below). Monitoring of habitat types and plant species in Natura 2000 areas has not been established yet in Slovenia, so the evaluations are based only on research efforts, which are included in different projects.

All of the above could be used to established suitable indicators within the CAP, but their implementation is limited by the available budget so sufficient funds for the CAP technical support should be ensured. In some cases, a short-term limitation is also a shortage of trained volunteers or professionals, which could be overcome by additional training if the monitoring schemes were implemented systematically every year or by monitoring areas in sequences (e.g. one fifth of Natura 2000 areas each year in the case of the monitoring of habitat types).

Furthermore, it is necessary to update the existing monitoring of biodiversity to also enable the assessment of the policy impacts on biodiversity. This could be done e.g. by including additional

sampling units, which are placed in landscapes with higher shares of implementation of targeted biodiversity measures. Since 2016, this approach has been applied in the case of the farmland bird monitoring scheme, where the initial sample of 110 transects was expanded to 140.

Q4.3 What are the best biodiversity indicators that can be proposed for the Complementary Result Indicator (FA 4A)?

“Restoring, preserving and enhancing biodiversity, including in NATURA 2000 areas, and in areas facing natural or other specific constraints, and high nature value farming, as well as the state of European landscapes”. See also here: https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/complementary-result-indicators-pillar-ii_en.pdf

Note: such indicators should be feasible to collect and analyse in multiple MSs, they have a running monitoring system and available data, and can clearly interlink CAP interventions with observable biodiversity impacts. Indicators exist on different levels: farm-level, regional-level and member state-level)

Indicator (please note the kind of indicator and at which level your indicator is used)	Justification	For all MSs?

Reply Spain

Workshop facilitators: Elena D. Concepción (Department of Biogeography and Global Change (BGC–MNCN)), Mario Díaz (Department of Biogeography and Global Change (BGC–MNCN)), Manuel B. Morales (Terrestrial Ecology Group (TEG))

Participants: Juan Carlos Alonso (Grupo de Ecología y Conservación de Aves, Museo Nacional de Ciencias Naturales), Francisco M. Azcárate (Terrestrial Ecology Group (TEG)), Ignacio Bartomeus (Estación Biológica de Doñana, Consejo Superior de Investigaciones Científicas (EBD-CSIC)), Gérard Bota (Landscape Dynamics and Biodiversity Program, Forest Science and Technology Centre of Catalonia (CTFC)), Lluís Brotons (InForest JRU (CTFC-CREAF)), Luis M. Buatista (Grupo de Ecología y Conservación de Aves, Museo Nacional de Ciencias Naturales), Fabián Casas (Department of Functional and Evolutionary Ecology), Elena D. Concepción, Mario Díaz, Daniel García (University of Oviedo. Department of Organisms and Systems Biology (BOS; Ecology Unit) and Research Unit of Biodiversity (UMIB; UO-CSIC-PA)), David Giralt (Landscape Dynamics and Biodiversity Program, Forest Science and Technology Centre of Catalonia (CTFC)), José E. Gutiérrez (SEO/BirdLife International), José V. López-Bao (University of Oviedo. Department of Organisms and Systems Biology (BOS; Ecology Unit) and Research Unit of Biodiversity (UMIB; UO-CSIC-PA)), Santiago Mañosa (Departament de Biologia Evolutiva, Ecologia i Ciències Ambientals, Institut de Recerca de la Biodiversitat (IRBio)), Rubén Milla (Departamento de Biología, Geología, Física y Química Inorgánica), Marcos Miñarro (Servicio Regional de Investigación y Desarrollo Agroalimentario del Principado de Asturias (SERIDA)), Manuel B. Morales, F.M., Gerardo Moreno, Alberto Navarro (University of Oviedo. Department of Organisms and Systems Biology (BOS; Ecology Unit) and Research Unit of Biodiversity (UMIB; UO-CSIC-PA)), Pedro P. Olea (Terrestrial Ecology Group (TEG)), Carlos Palacín (Grupo de Ecología y Conservación de Aves, Museo Nacional de Ciencias Naturales), Begoña Peco (Terrestrial Ecology Group (TEG)), Pedro J. Rey (Departamento de Biología Animal, Biología Vegetal y Ecología), Christian Schöb (Agroecology Solutions S.L.), Javier Seoane (Terrestrial Ecology Group (TEG)), Susana Suárez-Seoane (University of Oviedo. Department of Organisms and Systems Biology (BOS; Ecology Unit) and Research Unit of Biodiversity (UMIB; UO-CSIC-PA)), Rocío Tarjuelo (Institute for Game and Wildlife Research), Juan Traba (Terrestrial Ecology Group (TEG)), Francisco Valera (Department of Functional and Evolutionary Ecology), Elena Velado-Alonso (Estación Biológica de Doñana, Consejo Superior de Investigaciones Científicas (EBD-CSIC))

Workshop date: 12.11.2020

Q1: How can the different Green-Architecture elements optimally complement each other?

a) In its design (e.g. how AECM or Eco-schemes should be designed/funds allocated/improved)?

EU level	Your Member State (/region)
Three main goals: 1. Every green-architecture element should be designed to achieve a specific and quantifiable objective (Navarro & López-Bao, 2018). 2. Measures should be designed independently, although searching for synergies in relation to general goals of the green-architecture. 3. Measures of the green-architecture not focused on environmental issues should not be allowed.	Same. Actually, in relation to biodiversity, so far in Spain, agro-environmental measures have been the unique measures resulting in positive effects, such as the protection of habitats for steppe birds (Kleijn et al. 2006, Concepción & Díaz 2019).
Furthermore, the Green Architecture measures should be modulated regionally (member states or regions within them): in more complex landscapes, maintaining existing Green-Architecture elements could be incentivized through advanced conditionality preventing the loss of these elements and then landscape simplification, in combination with Eco-schemes providing incentives for their maintenance and management. In simpler landscapes, voluntary Eco-schemes may be the most effective option for supporting targeted creation of new Green-Architecture (Díaz & Concepción 2016, Concepción et al. 2020)	AECM and Eco-schemes design should be based on the explicit consideration of farms as territorial entities that are embedded within dynamic and heterogeneous landscapes, where they play different roles in terms of landscape connectedness and biological connectivity. In fact, the environmental potential and impact of each single farm depends not only on its local quality (i.e. farm spatio-independent relevance), but also on the landscape context (i.e. farm spatio-dependent relevance). Farms are key stones that guarantee the effectiveness of the multiple scale-dependent ecological processes that occur across the landscape. Thus, any policy design should take into account the landscape-scale context of individual farms, as well as their interaction with the surrounding landscape at different spatial scales. The design of AECM and Eco-schemes should also recognize a spatially nested structure enabling to combine coordinated actions in private and public lands. For instance, favouring hedgerows/small patches of seminatural woody habitat around private orchards (Eco-scheme) should be combined with the protection of a percentage of forest (AECM) on public lands in the surrounding landscape (ideally 1000 m radius) in order to achieve functional landscapes.

Given the strategic plans will be designed by the MSs, the EU must play a role in ensuring the ambition of the objectives and checking for the possible existence of distorted channels that lead to widespread funding of farmers not committed to biodiversity conservation.	The three instruments, in principle, complement each other well. However, given the experience in Spain, there is a significant risk that they will be misused to subsidize farmers not committed to conservation. this risk seems greater the closer the administration is to the farmer. Broadly speaking, measures with the greatest risk of fraud (AECMs, Eco-schemes) should be designed and controlled by higher administrations (EU, central government through strategic plans), while regional or local administrations could play a more relevant role in enforcing the enhanced conditionality.

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	Your Member State (/region)
Although measures will be framed under a common framework at a high level, they should be adapted to every particular context, that is, it is important to consider flexibility during implementation (Navarro & López-Bao 2018). An example of this idea would be the UK approach, where there was a basic, entry level, and a higher level for environmental stewardship (but see Hejnowicz et al., 2016). Eco-schemes may be similar to entry-level measures and AECM to higher-level ones.	AECM and Eco-scheme implementation should be based not only on the criteria of land surface, but also take into account explicitly the natural value and quality of farms <i>sensu stricto</i> (provisioning potential of ecosystem services, species composition, targeting spontaneous natural species,...), as well as the added value associated to its singularity and strategic position within the landscape. Strategic plans should be coordinated by local administrations enabling to control for effects of small-scale land ownership.
Monitoring, evaluation and adaptive management (i.e., modification according to the results obtained; Díaz & Concepción 2016)	It is essential to create an independent commission or body to ensure compliance with the requirements for receiving aid from the CAP, which should be made up of scientific and civil servants who are not subject to the vagaries of the electoral processes. This body should audit the three tools: AECMS, Eco-schemes, and enhanced conditionality. Although it is assumed that the generality of

	farmers will access the financing foreseen in the enhanced conditionality, I understand that if an honest control is made on the compliance with the GAECs, the enhanced conditionality could provide a greater contribution than expected to the achievement of sustainable farming in EU.
--	---

Specific questions:

Q1.1: What type of measures should each Green-Architecture instrument focus at from an environmental perspective?

Instrument	Should cover...
AECM	- Three general goals: biodiversity conservation, environmental quality in the long-term, and adaptation to climate change. Landscape-scale design by reinforcing possibilities of cooperative/aggregate application Manageability of public land. - Additional conservation targets (more specific): threatened biodiversity (species and/or+ habitats) - Particularly specific and ambitious long-term measures, aimed at promoting management models that clearly favor the conservation of biodiversity (transhumant livestock extensive farming, dehesas, rainfed cereal agriculture, soil conservation agriculture with low or no tillage, mixed Eurosiberian systems, etc.). The fact that AECMs can be addressed to actors other than landowners opens the possibility of implementing measures through shepherds or other entities, with longer-term actions (multiannual contract time). AECMs can be adequate to implement functional improvements at large spatial scales (connectivity between ecosystems or remote regions, promotion of grazing and transhumance), more difficult to achieve by Eco-schemes.
Eco-schemes	- The same general goals, but at a wider level. - Environmental quality at short-term. Small-scale private actions. Diversity of options. - Maintenance/management of green architecture - Eco-schemes can function as an intermediate instrument between AECM and Enhanced Conditionality, in the sense that they can be implemented on a shorter time scale than AECM but being more selective than Enhanced Conditionality. They are also the tool by which we can introduce more context-dependent control. In this sense, we should design them specifically for natural regions. Thus, for example, more

	emphasis should be placed on irrigation control in the Segura River Basin than in basins with higher rainfall, more emphasis on erosion control in mountainous regions than in plains, etc. Their success will depend on their not becoming a widespread generalist aid. Eco-schemes are particularly appropriate for undertaking structural changes in the landscape, promoting the presence of those traits that have been shown to be most effective for biodiversity conservation. The emphasis on landscape structural actions, and therefore with a vocation of permanence, can counteract the perverse effects derived from the fact that the payment is annual.
Enhanced Conditionality	- A better enforcement of existing norms aimed to reduce the impact of agriculture intensification (ie. agrochemicals, animal welfare, etc.). Thus, conditionality should include all environmental legislation related to agriculture (WFD, pesticides, etc.). - Law observance (compulsory) + Additional requirements Reduce the number of exceptions - Basic standards of environmental quality in farms at large-scale. Specially recommended for countries culturally prone to suffer the “tragedy of commons” (e.g. Spain). - GAECs seem reasonably well designed, and if taken seriously, can contribute decisively to the transition to a multifunctional agricultural model, which is not only focused on productivity. Their success will depend on the seriousness of the states in demanding their compliance in return for receiving the aid. The risk is that, since they constitute a significant part of farm income, states are likely to be lax in their compliance

Q1.1.1: What are the most important pros and cons of each instrument?

Instrument	Pros	Cons
AECM		Voluntary and individual application Too general objectives No monitoring of their real impact on biodiversity
Eco-schemes		Voluntary and individual application Too general objectives No monitoring of their real impact on biodiversity
Expanded Conditionality	Compulsory	Low ambition Many exceptions

Q1.2: Which conflicts between instruments, that you are aware of, can be resolved in the new Green Architecture and how? (at EU level or in your country)

Problem	Solution
AECM: Lack of spatial and multi-scaled contextualization. Landscape measures should not be implemented without the consideration of the quality of local private lands. Constraints to control for local-scale private land actions. Eco-schemes: Budget shortage and temporal limitation may constrain effectiveness. Scaling and spatial-context restrictions. Expanded Conditionality: People reluctance against mandatory environmental restrictive actions. Landscape measures implemented without consideration of quality of local private lands.	Establishing clear priorities within each block of instruments. Establishing hierarchically nested, scale-dependent goals and protocols. Improvement of farmers' perception and knowledge of biodiversity and its importance
The assignation of incomes exclusively according to a land surface criteria drives to polarized land uses across the landscape: intensification on the most fertile and productive lands, where the degree of mechanisation is high, and land abandonment in marginal lands managed by aged farmers with less technical tools. This is a source of social differences.	To guarantee budget stability and temporal continuity on a pluri-annual basis, which will allow a solid provision of ecosystem services. To prevent environmental misinterpretations on the environmental criteria defined for funding assignment.
Incoherence between distinct instruments (e.g., maintenance of trees could not be	Coordinating and reinforcing objectives: avoiding contradictions in the aims of different tools (e.g. compulsory conditionality may

supported because wooded lands are excluded from subsidies) Excessive bureaucratic and administrative rules and controls	support the maintenance of a given element, and Eco-schemes its restoration to desirable levels) Joint application for different instruments Unique observance controls
In principle, the three instruments seem adequately differentiated. However, the Eco-schemes could end up being misinterpreted as a mere extension of enhanced conditionality. Some regional governments in Spain have already expressed their intention to do what they can to reach all farmers. This interpretation may constitute a distortion of both instruments.	The control of the compliance with the commitments corresponding to each of the three tools should be in the hands of some independent entity, or at least not excessively influenced by the short-term interests of the farmers. In this sense, regional governments do not seem to be good candidates, since they tend to bend easily to the demands of farmers, postponing environmental targets sine die. If Eco-schemes do not reach everyone, but only the fraction of farmers who actually implement environmentally efficient measures, should be, in itself, an indicator of the good functioning of this tool.

Q1.2.1: How can the EU and Member States (MSs) reduce conflicts and maximise synergy among Green-Architecture instruments?

EU level	Your Member State (/region)
Coordinating and reinforcing objectives: avoiding contradictions in the aims of different tools (e.g. compulsory conditionality may support the maintenance of a given element and Eco-schemes its restoration)	

Q1.3: What should be quality criteria for the EU Commission to evaluate ambition in the Member States' [your country's] Strategic Plans? (e.g. minimum requirements from MSs to ensure success of the Green Architecture as a whole)

At least 10% of farmland should be composed by semi-natural habitats and connectivity features, and 10-20% by extensive farmland (BIOGEA Policy Recommendations (2020).)

The criteria used by the EU Commission to evaluate MSs Plans should ensure:

- Eco-schemes only benefit the subset of farmers who implement outreach measures, and that they do not behave like a generalized subsidy.
- MSs have independent control bodies.
- MSs invest in the monitoring of indicators directly linked to goals.

MSs should adopted regional targeting, which should not be confused with an autonomous community control of funds, but as a real adaptation of the measures to the environmental constraints of each ecoregion.

Q1.3.1: What are the barriers, caveats to consider?

EU level	Your Member State (/region)
	Excessive bureaucratic and administrative rules and controls

Q1.4: Under which conditions could other CAP-instruments be considered as contributing to the Green Architecture? (E.g. Areas of Nature Constraints, investments, AKIS/consultancy, sectoral payments or DP (coupled/non-coupled) etc.)?

If Areas of Nature Constraints overlaps with High Nature Value Farmlands. ANC can count as contributors, although specific measures for High Nature Value Farmlands to just maintain valuable agricultural landscapes should also be developed

To consider these instruments as contributors to green architecture, environmental criteria should be explicitly introduced in their design.: For example, in the case of Areas of Nature Constraints: only if the population setting policies are not linked to high impact programs, and the subsidies are focused on the survival of high nature value (HNV) farmlands (Anderson & Mamides 2020,); in the case of AKIs, only if they are innovation systems expressly designed for the reduction of the environmental impact of agriculture (reduction of water consumption, etc.).

Q1.4.1: Are there (additional) CAP- instruments that should be considered for the Green Architecture? Under which conditions?

Specific measures for high nature value farmland

Q1.4.2: What should be defined as minimum requirements from MSs to ensure success of the Green Architecture as a whole?

They should be in line with the objectives of the new EU Green Deal and Biodiversity Strategy.

See Question 1.3

Q2: What can be the role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?

Role: they should honour its name and have a positive impact on environment and conservation. For this reason, they should be directed to conservation and environmental protection issues within farmland (UAA).	Design: must follow a result-based scheme design. There is already a lot of knowledge about this. Three issues appear to be particularly critical to the success of schemes that pay for results. These are: i) clearly defined environmental objectives, ii) suitable indicators of these objectives, on which the result payments are based, and iii) socio-economic context (Herzon et al., 2018).
They should play a pivotal role, as actions are directly taken by farmers, not by the Administrations. They should be based on biodiversity-food production win-win solutions. The design of Eco-schemes should make attractive to the farmer the maintenance of natural diversity and sustainable practices, both implying a plus of environmental quality added to the standards guaranteed by the extended conditionality instrument. The main via to achieve this target would be through annual incomes, but also through educational training aimed to show farmers scientific evidences of how particular environmental measures may improve agricultural productivity or, at least, enhance the ecological value (and, then, the possibility of achieving extra incomes) of their farms. Therefore, the successful design and implementation of Eco-schemes require a farmer training targeted to incentive the application of non-traditional knowledge (scientific background) on agricultural activities.	
They should be able to aim regionally targeted environmental objectives (e.g., 10-20% extensive farmland) and be implemented at the landscape scale to improve habitat connectivity at broader scales	

What key factors and considerations should be made in ensuring the Eco-schemes are attractive (for MSs and farmers), effective, cost-efficient (in relation to the spent budget)

and synergistic with AECM and other instruments? *(Please remember that measures should fit to an annual scheme and applying for an Eco-scheme is voluntary for farmers)*

a) In their design (e.g. how AECM or Eco-schemes should be designed/improved):

EU level	Your Member State (/region)
Regional or site specific design (Díaz & Concepción, 2016) and less bureaucratic burden (eg. Pavlis et al., 2015) and simplification (Hejnowicz et al., 2016; Navarro & López-Bao 2018). Fair payments (Lastra-Bravo et al. 2015; Russi et al. 2016; Navarro & López-Bao 2018)	.
The key to ensure the attractiveness of Eco-schemes is the extra income that farmers would receive back from maintaining a certain level of environmental quality in their farms and, then, in the landscape. In the design of AECM or Eco-schemes, the environmental and land criteria that will be considered to assign the funding should be defined clearly. This aspect is key to ensure the efficiency of the investment. The design should integrate, by means of planning and management tools, the hierarchical conservation priorities identified at both farm and landscape level.	
Co-design options with farmers and local stakeholders. There is increasing evidence that uptake is higher when farmers are involved in the design process. There is an increasing trend to “pay by results”, ideally, evaluating biodiversity trends for a set of taxa, but how to achieve these results should be more flexible.	

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	Your Member State (/region)
Production are not compromised (Baur et al., 2016). Advisors are needed to help in the implementation process (Lastra-Bravo et al., 2015; Pavlis et al. 2015; Hejnowicz et al., 2016); and with ecology and conservation backgrounds because until now they are skewed to agronomic issues (Navarro & López-Bao, 2018)	Periodic monitoring of key indicators to evaluate the accomplishment of the criteria that have allowed the achievement of the funding. Feasibility by farmers on their own or with low dependence from external inputs (e.g. commercial devices, such as bird nest boxes or seed mixtures for flower strips).
	Implementation should be accompanied by a monitoring, evaluation and adaptive-management program to make sure the objectives are being accomplished, otherwise measures should be modified (Díaz & Concepción. 2016).
	In the implementation of Eco-schemes, care should be taken to: -avoid perverse mechanisms that result in a generalized distribution of funds, making Eco-schemes a mere complement to enhanced conditionality. -keep the control of compliance with Eco-schemes away from administrations that are too close to the particular interests of farmers (municipalities, autonomous communities). It is already being said by certain politicians at the autonomous community level that the objective is for the Eco-schemes to reach "all" farmers. In certain communities that are very conditioned by the lobby of intensive agriculture or irrigation we have countless examples of the connivance of politicians with the failure to comply with environmental regulations. -explore options such as implementing competitive regimes among farmers to ensure that only the most committed receive these supports.

Specific questions:**Q2.1: What are the pros and cons of a closed list-based approach (menu of options)?**

Pros	Cons
Avoid non-environmental measures. Ensure dark green measures are included. Clear targets and common general rules for MS.	Less plasticity/adaptability. Counterproductive effects of a lack of flexibility (eg. Sokos et al., 2013; Babai et al., 2015; Schermer et al., 2016). “Top-down” approach (ie. less acceptance (eg. Burton & Paragahawewa, 2011; Babai et al., 2015)).
Uniformity for funding assignment and monitoring control.	Underestimation of farm attributes related to singularity and/or strategic location across the landscape, which play a basic role for landscape heterogeneity and functionality.
Flexibility, enough uptake	Lack of coherence with the overall objectives (e.g., if most farmers chose the easiest options that do not contribute enough to e.g. the goal of 10-20% extensive farmland to achieve landscapes of intermediate complexity where field-scale measures can be effective)
They are less dependent on measurements, which in turn are more vulnerable to fraud	Their effectiveness is more dependent on the previous design, and therefore they are more vulnerable. Regional targeting could be weakened, unless these lists are specific to natural regions/production systems or are complemented by region-specific measures. Farmers could choose measures with low impact in his/her production system, or that have little or no beneficial impact on his region, making Eco-schemes a sort of enhanced conditionality extension.

Q2.1.1: What should be defined as minimum requirements for Eco-schemes to contribute to the success of the Green Architecture as a whole?

Guarantee enough uptake among farmers to have an effect at the landscape scale (Concepción & Díaz 2019, Concepción et al. 2020)

Q2.2: If the EU and MSs choose on a menu option, what would you list as examples that should or should not be included? *(Please remember that measures should fit to an annual scheme and applying to an Eco-scheme is voluntary for farmers)*

a) Examples of concrete, potentially-effective/cost-efficient Eco-scheme options that should be included:

At EU level	In your MS / region	Why?
	Trashumance Transhumance is a traditional livestock practice consisting of the seasonal movement of livestock between high or higher latitude areas, destined for summer pastures, and low or lower latitude areas, where cattle spend the winter, following established regular routes.	Trashumance has many environmental benefits in Spain and the Mediterranean basin as well (Bunce et al., 2006; Azcárate et al., 2012; Hevia et al., 2013; Oteros-Rozas et al., 2013, 2016;; García-Fernández et al., 2019).
High biodiversity grasslands maintenance / conservation.		They are at risk and it is easy to be applied once identified because it only needs to keep doing what is already doing. As a result-based scheme is worth take into account previous experiences (eg. de Saint Marie, 2013; Magda et al., 2015).
Coexistence with large carnivores		Large carnivores (LCs) are expanding their populations and ranges across Europe (Chapron et al., 2014), and their presence often conflict with agricultural practices. The CAP can adopt a payment for living with these species and needs to promote the adoption and maintenance of prevention measures. Because farmers who live with LCs have a competitive disadvantage compared to farmers who do not live with LCs (see Vella & Hogan, 2019).

Conservation of seminatural woody habitat within farm.	1.Conservation of seminatural (i.e. non-exotic) woody hedgerows (≥ 2.0 m width; ≥ 2.0 m height, including fleshy-fruited species) in 50% of farm edge (= 400 m²/Ha). WO, VO, AC, EP Or 2.Conservation of 5%* of farm area as patches of seminatural (i.e. non-exotic species) forest habitat (woody habitat ≥ 4.0 m height, including remnant trees), on a per Hectarea basis (≥ 500 m²/Ha). WO, VO, AC, EP * 2.5% optional with proportional granting Farm system: WO= Woody orchards (e.g. apple, kiwifruit, blueberry, hazelnut, walnut, etc); VO= Vegetable orchards (vegetables, legumes, etc); AC= annual crops (corn, alfalfa, cereal, ray-grass); EP= extensive seminatural pasture.	Álvarez-Martínez et al. 2014; García & Martínez 2010; García et al. 2010, 2018; García-Llamas et al. 2019; Happe et al. 2019; Herrera & García 2009, Martínez & García 2015, 2017; Martínez-Sastre et al.- 2020a, 2020b; Miñarro & García 2016, 2018, 2020; Miñarro & Prida 2013; Morán-Ordóñez et al. 2013; Rosa-García & Miñarro 2014; Suárez-Seoane et al. 2002.
Conservation of seminatural permanent herbaceous cover within farm	. 1.Conservation of seminatural (i.e. non-exotic) permanent herbaceous, multispecific floral strips (≥ 1.5 m width) in 5%* of farm area (= 500 m²/Ha). WO, VO, AC Or 2.Conservation of seminatural (i.e. non-exotic) permanent herbaceous cover (≥ 1.0 m width) in inter-row aisles. WO, VO * 2.5% optional with proportional granting Farm system: WO= Woody orchards (e.g. apple, kiwifruit, blueberry, hazelnut, walnut, etc); VO= Vegetable orchards (vegetables, legumes, etc); AC= annual crops (corn, alfalfa, cereal, ray-grass).	Happe et al. 2019; Martínez-Sastre et al. 2020, Miñarro & García 2016, 2018, 2020.
Conservation of biodiversity-friendly traditional elements (dry-stone walls, permanent ponds, stone fountains) within farms	. Conservation of traditional dry-stone walls in farm edges (≥ 0.5 m width; ≥ 0.5 m height) in 50% of farm edge. WO, VO, AC, EP Farm systems: WO= Woody orchards (e.g. apple, kiwifruit, blueberry, hazelnut, walnut, etc); VO= Vegetable orchards (vegetables, legumes, etc); AC= annual crops (corn, alfalfa, cereal, ray-grass); EP= extensive seminatural pasture.	Assandri et al. 2018, Manenti 2014.

Conservation of traditional seminatural meadows.	Maintenance and sustainable management of extant traditional seminatural meadows endangered by intensification (overgrazing, eutrophication, intensive mechanization, transformation to annual monocultures such as ray-grass and corn, etc).	Prince et al. 2012
Provision of biodiversity-friendly devices	Set up and mid-term maintenance of small-scale devices providing habitat for pollinators and natural enemies of pests. WO, VO, AC, EP Farm systems: WO= Woody orchards (e.g. apple, kiwifruit, blueberry, hazelnut, walnut, etc); VO= Vegetable orchards (vegetables, legumes, etc); AC= annual crops (corn, alfalfa, cereal, ray-grass); EP= extensive seminatural pasture.	Miñarro & García 2018, 2020; Murano et al. 2019; Paz et al. 2013
Support for biodiversity-friendly Land Consolidation Schemes	Land Consolidation Schemes should be supported when demonstrating biodiversity-friendly actions, mostly maintaining habitat patchiness forest habitat ($\geq 500 \text{ m}^2/\text{Ha}$ of patches of seminatural woody habitat $\geq 4.0 \text{ m}$ height) or hedgerows ($\geq 100 \text{ m}/\text{Ha}$ $\geq 2.0 \text{ m}$ width; $\geq 2.0 \text{ m}$ height, including fleshy-fruited species), on a per Ha basis. WO, VO, AC, EP Farm systems: WO= Woody orchards (e.g. apple, kiwifruit, blueberry, hazelnut, walnut, etc); VO= Vegetable orchards (vegetables, legumes, etc); AC= annual crops (corn, alfalfa, cereal, ray-grass); EP= extensive seminatural pasture.	Clough et al. 2020
Conservation of riparian vegetation	. Riparian buffer strips of semi-natural vegetation (i.e. bands of 30m around fields) to provide an effective physical barrier against nitrogen (N), phosphorus (P) and sediment transfer. This measure, or similar, is mentioned in the enhanced conditionally instrument, but we do not know if both have the same implications.	Baudry & Thenail 2004; Cole et al. 2020; Ernoult et al. 2013; Gascuel-Odoux, et al. 2009 ; Fischer & Fischenich 2000; Groffman et al. 1991; Hille et al. 2018; Merot et al. 2009; Serra et al. 2020; Stutter et al. 2012; Vought et al. 1995.
Green-architecture elements should be regionally chosen according to the idiosyncrasy of each agricultural landscape: what may	The same applied for regions within member states: respect regional idiosyncrasy. Policy recommendation for different dry-cereal regions in Spain (extracted from Concepción & Díaz 2019) : Ebro basin (north-east Spain):	

be valuable in one region may be not in another, even for the same agrosystem and within the same country (see e.g., Concepción & Díaz 2019, Concepción et al. 2020). Nonetheless, some general advices would be : 1.Prevent enlargement of field size 2.Support connectivity and small landscape elements CHARACTERISTIC of each region Support grassland and fallow land	- Legume (N-fixing) crops (spring) - Crop diversification (spring and winter) - Fallow land (winter) - Permanent crops Castilla y León (north-central Spain): - Legume (N-fixing) crops (spring) - Fallow land (spring and winter) - Diversification of winter covers (including fallow land, legume and cereal crops). Castilla-La Mancha (south-central Spain): - Legume (N-fixing) crops (spring) - Crop diversification (spring) - Fallow land (winter)	
---	--	--

b) Examples of concrete, ineffective or problematic or cost-inefficient options that should not be included:

At EU level	In your MS / region	Why?
	The protection of particular landscape elements, as semi-natural hedgerows, at farm scale not considering the spatial context at landscape scale may be functionally ineffective.	Concepcion et al. (2012)
	Prescribed fire or mechanical clearing of scrubland in montane pasture areas (prescription only allowed for disturbance-needed habitat/species at small scale). These measures usually lead to losses of soil nutrients and biodiversity, and to the collapse of forest regeneration.	García & Obeso 2003, Martínez & García 2017

Permanent and cover crops, agroforestry and crop diversification had fewer benefits than grassland, fallow land and the connectivity and landscape features for biodiversity (Concepción et al. 2020 Biol. Conserv)		
	Avoiding more aids to afforestation	In Spain, forest areas are increasing, and occupy near one third of the country surface (www.mapa.gob.es), one of the higher values of the EU. The increase is in part because of land abandonment, but also due to massive afforestation programs of the twentieth century, which have led to a significant volume of masses with high risk of fire (Da Ponte et al 2019,) and other ecological problems (Maestre & Cortina 2004,). In addition, afforestation in agricultural lands is commonly performed using inadequate methods from a restoration ecology perspective (irrigation, tillage, etc.). It is probably time for the promotion of other habitat types not necessarily afforested.
	Nitrogen fixing crops	Much lower interest for conservation than other actions, like fallows (Tarjuelo et al 2020,).
	"Organic Agriculture" label.	Sometimes, these labels can mask unsustainable management models, with, for example, more GHG emissions (Clark 2020,). In the particular case of Spain, it is not uncommon to see some organic farms ploughing on high slopes or using large amounts of water for irrigation.

Q2.2.1: What are the pros and cons of a closed list-based approach (menu of options)?

Pros	Cons
Flexibility, enough uptake	Lack of coherence with the overall objectives

Q2.3: What are the pros and cons of a top-up payment versus income foregone? What would you recommend and why?

Pros	Cons
More acceptance.	Difficult to value.
More realistic budget assignment according to specific environmental traits of the farms, considering extra values related to singularity or strategic position (landscape nodes).	...
More realistic and fair system to support farmers that really are promoting biodiversity and ecosystem services	Farmers and other lobbies reluctance
-It conveys a more positive image of conservation -It better transmits the idea that conservation is not a cost, but an investment If implemented well, it can be more attractive and better select committed farmers	
-	“income foregone” assumes there is a loss of productivity, perpetuating this view despite current evidence that conserving biodiversity can also enhance productivity (see recent Tamburini et al 2020)

Q2.3.1: If the EU and MSs choose on a menu option, what would you list as examples that should or should not be included? *(Please remember that measures should fit to an annual scheme and applying to an Eco-scheme is voluntary for farmers)*

Examples of concrete, potentially-effective/cost-efficient Eco-scheme options that should be included:

At EU level	In your MS / region	Why?
Green-architecture elements should be regionally chosen according to the idiosyncrasy of each agricultural landscape : what may be valuable in one region may be not in another, even for the same agrosystem and within the same country (see e.g., Concepción & Díaz 2019, Concepción et al. 2020). Nonetheless, some general advices would be : 3.Prevent enlargement of field size 4.Support connectivity and small landscape elements CHARACTERISTIC of each region 5.Support grassland and fallow land	The same applied for regions within member states: respect regional idiosyncrasy. Policy recommendation for different dry-cereal regions in Spain (extracted from Concepción & Díaz 2019, Table 2) : Ebro basin (north-east Spain): - Legume (N-fixing) crops (spring) - Crop diversification (spring and winter) - Fallow land (winter) - Permanent crops Castilla y León (north-central Spain): - Legume (N-fixing) crops (spring) - Fallow land (spring and winter) - Diversification of winter covers (including fallow land, legume and cereal crops). Castilla-La Mancha (south-central Spain): - Legume (N-fixing) crops (spring) - Crop diversification (spring) - Fallow land (winter)	Policy recommendation for different member states and systems in Europe (extracted from Concepción et al. 2020, Table 2) : Spain (1)Extensive wood pastures – Iberian Dehesas – in Extremadura ✓Promoting grassland to support more specialist and threatened farmland species. ✓Maintenance of woody strips to support threatened (non-farmland) bird species. (2) Extensive arable land in Castilla-La Mancha ✓Promoting grassland, fallow land (especially covered fallow) and preventing field size enlargement to support more specialist farmland birds. ✓Maintenance of tree groups, isolated trees, streams/ditches, and vineyards to enhance overall bird diversity and/or threatened (non-farmland) bird species. ✓Maintenance of woody strips and grassland to support plant richness. ✓support overall and threatened bird diversity.

Examples of concrete, ineffective or problematic or cost-inefficient options that should not be included:

At EU level	In your MS / region	Why?
Permanent and cover crops, agroforestry and crop diversification had fewer benefits than grassland, fallow land and the connectivity and landscape features for biodiversity (Concepción et al. 2020)		

Q2.4: How should Eco-schemes best be organized spatially, among themselves and with respect to AECM? Please consider: How can this be promoted by the EU and administrated by MSs? How to balance cost-efficiency of the measure (focus on hot spot) vs. Broad scale application?

Eco-schemes should be establishment on a per-ha basis, in order to ensure fine-grained habitat patchiness (in those involving habitat features) as well as the small-scale ecological processes to be operational.

The assignment of Eco-scheme budget should be hierarchically organized at both farm and landscape scales through planning and management actions. If structural elements, as hedgerows or stream strips, are only protected at farm level, not considering the spatial context at landscape scale, the level of connectedness and connectivity, as well as spatial heterogeneity, would be insufficient to support efficient biotic and abiotic fluxes. Indeed, if farm attributes related to singularity and/or strategic location across the landscape are underestimated, landscape functionality would be dismissed. Thus, the identification of patches acting as centrality hubs in landscape-scale habitat networks seems crucial.

Eco-schemes should be combined with AECM landscape-scale measures involving public lands.

Eco-schemes should be designed and implemented at regional level and at broad scale in order to have an impact on the configuration and composition of agricultural landscapes.. More specific measure can be implemented by means of AECM or high nature value farmland. Eco-schemes should guarantee enough uptake among farmers to have an effect at the landscape scale (Concepción & Díaz 2019, Concepción et al. 2020)

Eco-schemes will work primarily at the farm level, since the recipients are the landowners, while the AECMs can work at different scales because they are not linked to these actors alone. AECMs, therefore, may be a more suitable tool to improve spatial properties at larger scales, such as connectivity between remote spaces. It can be a useful tool to favor management models such as transhumance, thus achieving ecological benefits at a supra-regional scale.

Involving more stakeholders to create land-stewardship (<https://landstewardshipproject.org/>) associations allows to give power to the farmers to implement Eco-schemes at landscape level, the level where conservation takes place.

Q2.4.1: What are the pros and cons of a top-up payment versus income foregone? What would you recommend and why?

Pros	Cons
More realistic and fair system to support farmers that really are promoting biodiversity and ecosystem services	Farmers reluctance

Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)

S.M.A.R.T.: “Specific, Measurable, Ambitious/attainable, Realistic, Time bound”

Note: The Biodiversity strategy requires a) 10% landscape features, b) expansion of organic farming to 25% UAA and c) reduction in pesticide (impacts) by 50%.

What key factors and considerations should be made by MSs when setting targets in their CAP strategic plans, and how should the EU guide and assess them?

EU level	Your Member State (/region)
To consider, for each particular region, which are the dominant global change trends, mainly on land use and climate, as well as the main threats to landscapes and biodiversity, in order to prioritize target sensitive areas in which applying specific measures.	
Consulting a scientific advisory board	Consulting a scientific advisory board
In some EU states, agricultural and environmental management are not adequately coordinated, and neither are central and regional governments, which may share or segregate competences in many different ways, depending on the case. It is foreseeable that conflicts will arise between administrations in these member states when designing CAP strategic plans. Frequently, administrations with environmental competences are particularly weak. The EU should be very vigilant in ensuring that the strategic plans maintain the appropriate weight of environmental objectives. The EU should also ensure that the targets set in the plans are well on track to actually achieving the Biodiversity strategy targets by 2030. It is expected that the self-imposed targets of some countries will not be fully met, and the EU should therefore be very demanding and ask for considerable progress in this transition, and not allow plans that postpone critical targets.	Spain should make a firm commitment to strengthening the environmental objectives in its CAP strategic plan. To this end, it should give a more balanced weight to the Ministry of Agriculture, the Ministry of the Environment, and the agriculture and environmental sections of the Autonomous Communities. Under no circumstances should the target be that "all or most" farmers benefit from tools such as Eco-schemes or AECMs. Rather, this would be a desirable long-term horizon, but it is unrealistic to think that all farmers today have such an environmental commitment. Rather, targets should be set in order to clearly differentiate good agricultural practices from those that are not.

Targets should emphasize tangible functional objectives (reduction of the use of water, pesticides, fertilizers, antimicrobials) and not so much the adoption of labels with a strong commercial connotation (organic agriculture) which can mask very unsustainable practices.	
Directly related to biodiversity, and not proxies (e.g. 20% natural native habitats in working landscapes)	idem

Specific questions:

Q3.1: What should count as “ambitious” targets? (how do you measure ambition?)

A. Targets that go beyond established norms and regulations. Environmental issues over productive ones. B. It depends on the established objectives. The proposed CAP objectives are redundant and poorly defined and therefore very difficult to measure (Pe’er et al., 2017; Koester & Loy, 2016; Wieck & Hausmann, 2019; ECA, 2019). Clear quantitative targets should be developed in parallel to measures (Díaz & Concepción 2016)
Targets enabling to achieve “optimal biodiversity” at different levels (genetic, organisms, ecosystems) under realistic sustainable production schemes. Bukvareva (2018).
At least in line with the EU Green Deal and Biodiversity Strategy
Targets with more functional impacts, which are clearly related to the production of ecosystem goods and services, rather than the promotion of labels or designations that may hide unsustainable practices. One example is organic agriculture, mentioned above. Another example may be extensive livestock production: at present, this designation is applied to livestock regimes that raise animals outdoors, but sometimes keeping a high dependence on food inputs, and without a real extensive and pastoral management. For this example, an ambitious target could be to significantly increase the mobility of herds as a way of reducing the use of inputs while improving the overall management of the territory (Manzano Baena & Casas 2010, Hevia et al 2013, Carmona et al. 2013).

Q3.2: How should baselines be defined? (e.g. in terms of year, UAA/habitat cover etc.)

As a rule, and following the environmental policy integration approach in the EU, baselines should be based on reference values available in conservation laws (EU Habitats Directive). They could also be defined in UAA in some cases.
--

Habitat cover levels high enough to ensure a degree of spatial connectivity to promote effective landscape fluxes (percolation theory), both biotic (ensuring minimum viable population sizes and genetic diversity) and abiotic (guaranteeing water quality and erosion control).

Q3.3: What should the EU demand from your MS to clarify in its targets?

Payments/Funds distribution according to real biodiversity conservation accomplishment (e.g., actual biodiversity hosted by farms, systems, etc.), not following historical payments

EU should also call for an appropriate regional and production system context. This would avoid inconsistencies such as the difficulty of accessing aid from valuable systems properly managed, such as the case of dehesas and montados (Pinto-Correia & Azeda 2017), due to the undue application of out-of-context criteria.

At least for the Spanish case, ambitious and clear targets do not seem compatible with most farmers receiving the aid equally. In a way, the more widespread the aids are, the less ambitious and clear they probably are, and more we should be suspicious that they do not clearly distinguish between good and bad agricultural practices.

Q3.3.1: What should/could be done so that MSs would be ambitious in setting, measuring and meeting the targets?

Payments/Funds distribution according to real biodiversity conservation accomplishment, not following historical payments

Q3.4: What should MSs do to ensure that their targets translate into actions by farmers?

Recall that AECM and Eco-schemes are both voluntary. If they are not attractive, farmers will not take them up and, consequently, MSs may not be able to meet the targets.

Please try to provide concrete, feasible examples

Payments based on real biodiversity/conservation accomplishments

Reduce bureaucracy/administrative issues/rules/controls

Advice to farmers on the biodiversity benefits of different measures (agriculture officers and advisors need to understand the environmental reasoning of the proposed measures in order to promote them well;)

Q4: How can science improve the way indicators are used for performance evaluation of the CAP?

Note that the CAP comprises Output, Result and Impact indicators and in the next period also Complementary Result Indicators (CRI). Annexes are closed but a) methods can be improved and b) the CRI requires indicators for biodiversity.

- Deepening knowledge on the relationships between field management (small scale), landscape management (regional scales) and biodiversity and ecosystem services, as well as on how scales interact.
- Identifying adequate umbrella species to cover the requirements of as many other species as possible. Adjust umbrella species to the different agricultural systems and landscapes. Correctly identified umbrella species can then be used as flagships, but not vice versa.
- Identifying adequate landscape indicator features through their positive relationship with biodiversity measures. These features should be easy to use at large scale using
 - remote imagery.
- Periodically re-evaluating indicator performance to introduce potential improvements

Specific questions:

Q4.1 How can landscape features be best mapped? (Impact indicator to be used in the next CAP. Needs to be up to date, detailed)? It is feasible in your country?

Indicator	Justification	For which MSs?
%/UAA	Easy to measure (GIS) and to understand by multiple actors.	All
Proportion of cover, edge length, connectedness, distance to nearest habitat patch, biological and structural diversity of linear elements in the farm (hedgerows, stone-walls, riparian strips, floral strips). Measured using remote sensing bi- and tri-dimensional techniques (GIS, Lidar). Use of public platforms: https://land.copernicus.eu/pan-european/high-resolution-layers	Relevance of linear habitat elements, small forests and remnant trees as ecological and connectivity elements at the landscape scale.	All

https://www.copernicus.eu/es/servicios/vigilancia-terrestre		
Connectivity and landscape features (semi-natural elements such as field boundaries, trees, ponds, etc.), grassland and fallow land, mean path size of agricultural fields, number of crops along the year (rotations)	Most beneficial elements for biodiversity at EU level	All
Especially valuable systems (HNVF) in each member state	Highly relevant for biodiversity conservation at EU level, which however are being abandoned or intensified as a result of the lack of support	Specific of each member state or even regions within them
Density / distribution in the landscape of natural / seminatural fragments. Measurable by aerial photograph / satellite	Although it is well known that the total area of natural habitat is the primary determinant of the capacity of a given landscape to support biodiversity, growing evidence shows that a high number of fragments, not necessarily large, can constitute a more effective conservation strategy than the concentration of this area in a few large fragments (Fahrig 2020). This fact can be particularly relevant in agricultural landscapes, where it is desirable to have a good distribution of micro-reserves for bees, butterflies, ants, and a long list of groups which fulfil numerous functions & services	Spain, and probably extensible to other MSs.
% of natural native habitats in the landscape	Garibaldi et al. (2020)	all

Use of all agrochemicals / intensification practices	De guines et al. 2014 (https://esajournals.onlinelibrary.wiley.com/doi/10.1890/130054)	all
Diversity of crops and average field size	https://www.pnas.org/content/116/33/16442	all

Q4.2 How can the methods for biodiversity indicators be improved, for the habitats and species of the Habitats Directive? (Impact indicator to be used in the next CAP). It is feasible in your country?

Indicator	Justification	For which MSs?
Impact indicators: water consumption, at the farm level.	The transformation of rainfed to irrigated lands has dramatic consequences on biodiversity (De Frutos et al. 2015), apart from the obvious impact on a natural resource scarce in many Mediterranean countries.	Especially for Mediterranean countries
Impact indicators: other pressure indicators like pesticide, fertiliser, antimicrobial consumption, at farm level.		Generalizable for all countries.
Impact indicators: Bare ground, at the farm level.	Especially recommended for landscapes with steep slopes	Especially in Mediterranean countries, which are more vulnerable to erosion.
Natural & seminatural remnants	Apart from the evident positive impact on the fauna and flora inhabiting remnants, there is overwhelming evidence of the benefits of landscape complexity on different species at higher spatial scales (Roschewitz et al 2005, Fahrig 2020).	

Use and rest time in grazed lands, at the farm scale	Evidence indicates that rangelands subjected to seasonal grazing periods present a better ecological function and better regeneration (Carmona et al 2013).	
--	---	--

Q4.3 What are the best biodiversity indicators that can be proposed for the Complementary Result Indicator (FA 4A)?

“Restoring, preserving and enhancing biodiversity, including in NATURA 2000 areas, and in areas facing natural or other specific constraints, and high nature value farming, as well as the state of European landscapes”. See also here: https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/complementary-result-indicators-pillar-ii_en.pdf

Note: such indicators should be feasible to collect and analyse in multiple MSs, they have a running monitoring system and available data, and can clearly interlink CAP interventions with observable biodiversity impacts. Indicators exist on different levels: farm-level, regional-level and member state-level)

Indicator (please note the kind of indicator and at which level your indicator is used)	Justification	For all MSs?
Following previous examples in Q.2.2. at EU level: High Nature Value farmlands	High Nature Value farmlands. They are previously integrated within the CAP structure and recognized as a priority objective (CAP 2014-2020) (Navarro & López-Bao, 2018, 2019).	All
Large carnivore trends	Status in large carnivore populations and changes in range. This would be linked to another indicator capturing to the proportion of farms within these large carnivore ranges adopting proposed measures.	

Biodiversity monitoring surveys of a variety of organisms (plants, birds, butterflies, bees, etc., see below) in landscape plots (e.g., 1 km x 1 km) based on transects designed to ensure the full coverage of habitats within plots in accordance to the protocols established in some biodiversity monitoring programmes at landscape scale (e.g., Swiss BDM Z7 Species diversity in landscapes https://www.biodiversitymonitoring.ch/). This survey should follow standardized guidelines of the Pan-European Common Bird Monitoring Scheme of the European Bird Census Council and BirdLife International (https://pecbms.info/), Likewise, pollinators surveys should follow specific recommendations of the European Butterfly Monitoring Scheme (https://butterfly-monitoring.net/) and the Pollinator Monitoring Scheme for Bees (https://www.bwars.com/content/pollinator-monitoring-scheme).	Able to capture the overall effect of distinct conservation initiatives supporting green architecture (conditionality + Eco-schemes + AECS) on biodiversity	Yes. To allow comparisons
Connectivity and landscape features (semi-natural elements such as field boundaries, trees, ponds, etc.), grassland and fallow land, mean path size of agricultural fields, number of crops along the year Especially valuable systems (HNV) in each member state	Most beneficial elements for biodiversity at EU level and already available at EU level (e.g., from Copernicus Land Monitoring Services) Most beneficial elements for biodiversity at EU level and already available at EU level (e.g., from Copernicus Land Monitoring Services)	All Specific of each member state or even regions within them

Complementary indicators: Soil arthropod diversity, at farm scale	Although we do not have a generalisable and easy to measure index, there is a lot of evidence about the capacity of different groups of soil arthropods (e.g. ants, see: Hevia et al. 2013, 2019, , Azcárate et al 2013) to reflect the effects of different management models. I believe that it may be promising to explore indices of this type.	Yes, although they will require regional adaptation.
Complementary indicators: Connectivity index, at regional or landscape scales.	While in general it is not advisable the use of indices that do not directly measure biodiversity, I consider it essential to incorporate spatial connectivity indicators at scales larger than the farm scale, and it is more realistic to propose connectivity indicators based on landscape & spatial features rather than specific species information.	
Regarding pollinators, there is a EU initiative to monitor pollinators in all Mss. „European Pollinator Monitoring Scheme (EUPMS)“ https://wikis.ec.europa.eu/display/EUPKH/EU+Pollinator+Monitoring+Scheme	If already implemented, can be cost – effective.	Yes

Reply Sweden

Workshop facilitator: Juliana Dänhardt, Lovisa Nilsson (Both: Centre for Environmental and Climate Science, Lund University)

Participants: Riccardo Bommarco (Department of Ecology, Swedish University of Agricultural Sciences), Mark Brady (Centre for Environmental and Climate Science, Lund University & AgriFood Economics Centre, Swedish University of Agricultural Sciences), Yann Clough (Centre for Environmental and Climate Science, Lund University), Johan Ekroos (Centre for Environmental and Climate Science, Lund University), Katarina Hedlund (Department of Biology & Centre for Environmental and Climate Science, Lund University), Regina Lindborg (Department of Physical Geography, Stockholm University), Kimberly Nicholas (Lund University Centre for Sustainability Studies, Lund University), Ewa Rabinowicz (AgriFood Economics Centre, Swedish University of Agricultural Sciences), Maj Rundlöf (Department of Biology, Lund University), Henrik G. Smith (, Department of Biology & Centre for Environmental and Climate Science, Lund University)

Workshop date: 10.11.2020

Q1: How can the different Green-Architecture elements optimally complement each other?

What key factors and considerations should be made in ensuring the Green Architecture operates best?

a) In its design (e.g. how AECM or Eco-schemes should be designed/funds allocated/improved)?

Important that new Eco-schemes do not erode the funding of AECMs in cases where contractual multi-year arrangements are important for success.
They should be evidence or results-based through evaluation studies or estimations of environmental impacts (e.g., through modelling)

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

Seek multifunctionality! Choose a combination of interventions that have the best potential to achieve multifunctionality. Note that a focus on measures that in themselves are multifunctional may erode the total efficiency. For example, important to maintain some measures that are important for biodiversity per se, even if they do not have climate effects. Ensure that the chosen „menu of interventions“ as a whole is multifunctional, even if individual farmers then can choose to implement all or only part of the menu.

Ensure mechanisms so that the overall uptake of interventions results in the intended balance between different targets, such as biodiversity conservation and climate change mitigation as well as does not result in uptake of easier-to-implement measures of less efficiency.

Ensure coherence between (short-term) interventions in pillar I (Eco-schemes) and (long-term) interventions in pillar II (AECM) to achieve multifunctionality

Ensure possibilities to implement interventions with a landscape perspective in mind (where relevant), even though payments are directed to single farmers

Use interventions in pillar I (Eco-schemes) as short-term transition possibilities before joining the longer-term interventions in pillar II (AECM).

Specific questions:

Q1.1: What type of measures should each Green-Architecture instrument focus at from an environmental perspective?

Instrument	Should cover...
AECM	Support for semi-natural grasslands (including its design) is one of the most important AECMs in Sweden! Management plans (<i>åtagandeplaner</i>) targeted towards individual grasslands are important and (by farmers) appreciated guidance documents to ensure optimal management of specific grasslands. Current discussions about removing the option to get management plans in favour of lower administrative costs, and replace them with general requirements and increased general advice is in our opinion counterproductive. General requirements and advice is not sufficient to ensure optimal management of semi-natural grasslands due to the huge variation of grasslands and their individual conditions.
Eco-schemes	
Enhanced Conditionality	

Q1.2: Which conflicts between instruments, that you are aware of, can be resolved in the new Green Architecture and how? (at EU level or in your country)

Problem	Solution
1) Direct payments slow structural change 2) VCS to livestock increase GHG and nutrient emissions	Transferring a large amount of direct payments budget to Eco-schemes and introducing results-based environmental payments.

Q1.3: What should be quality criteria for the EU Commission to evaluate ambition in the Member States' [your country's] Strategic Plans? (e.g. minimum requirements from MSs to ensure success of the Green Architecture as a whole)

Targets set in CAP should reflect both targets and timelines given in relevant national and EU-strategies (i.e. Green Deal, Farm-2-Fork, biodiversity strategy).

Clear evidence of environmental improvements, i.e., quantification, is needed.

MS's planned achievements/ambitions should be judged in relation to how close to the targets the MS are (i.e. evaluation of ambitions should take into account both the progress achieved and the relative "travel length" still to cover in order to reach target)

Ambitions should be translated into the Strategic Plans in geographically differentiated levels (at least NUTS 2-level) as e.g. Sweden has very different conditions in different parts of the country. Many targets are set on national level, which does not give a relevant picture.

The cost-efficiency of chosen interventions should be taken into account (i.e. did MS choose interventions that give highest environmental or climate effects per expenditure). This includes also "social efficiency", i.e. saving on administrative costs does not necessarily improve overall efficiency if less is achieved in the end in terms of environmental effects.

The marginal contribution of the measures should be important, considering both "preservation" aspects (e.g. in relation to biodiversity, and "improvement" effects, e.g. in relation to carbon sequestration).

Develop, monitor and use indicators that better reflect the goals.

Q1.4: Under which conditions could other CAP-instruments be considered as contributing to the Green Architecture? (E.g. Areas of Nature Constraints, investments, AKIS/consultancy, sectoral payments or Direct Payments (coupled/non-coupled) etc.)?

Motivations need to be evidence-based (e.g. ANC) and of substantial importance!

Cattle support (Nötkreaturstödet) is partly motivated by being important for biodiversity, but for this to be true, there should be requirements for cows/cattle to graze semi-natural grasslands. Also, this support raises a potential conflict with climate goals.

The only reasonable criteria for counting a payment as a Green Architecture payment is if the measure is explicitly designed to do so. In Scown et al. 2020, "We define an environmental payment to include all CAP measures that state the intention to principally benefit nature, the environment, climate, or promote sustainable farming in the wording of the measure itself, and that involve more than the application of usual good farming practice or directly support production." According to this criteria, we identified 26 measures that could plausibly be constituted environmental payments. We found that these payments constituted only about 15% of CAP payments in 2015.

The Commission claims that 40% of the new CAP will be climate spending. This will require tripling funding for climate measures in the new CAP. Without substantial reallocation of payments to effective environmental measures, the post-2021 CAP will not achieve the European Commission targets of reducing greenhouse gas emissions 55% by 2030 and putting the alarming decline in biodiversity on a path to recovery by 2030.

List of environmental measures: Scown et al., 2020, Table S2:

<https://www.cell.com/cms/10.1016/j.oneear.2020.07.011/attachment/93d59604-c0af-4d7c-a98d-4f0e59212f7f/mmc1.pdf>

Analysis of 15% of payments: Scown et al., 2020: [https://www.cell.com/one-earth/fulltext/S2590-3322\(20\)30355-9](https://www.cell.com/one-earth/fulltext/S2590-3322(20)30355-9)

Q2: What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?

Flexible options that incentivise farmers to take short-term actions that benefit biodiversity (environment/climate). Try it out for one year before engaging in a long-term AECM option – natural link between (some of) the Eco-schemes and AECMs. Designed based on evidence of biodiversity benefit and fit into agricultural management. (If not evidence-based, it goes against the idea that compensations should be based on results.) Implementation should be <u>coupled with information</u> on benefits for biodiversity and potential for ecosystem service enhancement, including agricultural production benefits.	For example, „no pesticide use“ or „N-fixing crops“ for a year as try it out options (Eco-schemes) before entering organic farming (AECM). Possibility to combine measures that could give synergy in reaching multiple targets – synergy incentives/synergy bonus – both among Eco-schemes and between Eco-schemes and AECM. Even though Eco-schemes are annual agreements, multiannual interventions should be encouraged as they have a potential for having positive environmental effects.
--	--

What key factors and considerations should be made in ensuring the Eco-schemes are attractive (for MSs and farmers), effective, cost-efficient (in relation to the spent budget) and synergistic with AECM and other instruments? (Please remember that measures should fit to an annual scheme and applying for an Eco-scheme is voluntary for farmers)

a) In their design (e.g. how AECM or Eco-schemes should be designed/improved):

EU level	Your Member State (/region)
Based on evidence of biodiversity or environmental benefit. Payments should be differentiated to reflect true cost of implementation, or better: the expected or achieved environmental outcome. Ambitious environmental schemes are often costly to implement and not paid for accordingly. Hence, farmers choose to avoid them. Conditions (could be e.g. choice, requirements, implementation and/or combinations of interventions) that benefit multifunctionality Encourage multiannual interventions.	With a landscape context in mind – specific actions for specific regions. Collaborative implementation among neighbours to increase benefit. Differentiated compensation that is based on the expected effects. E.g. “Flower strips” (Blommande slättbygd): If you grow plants in a flower strip that are similar to the natural plant community, or if you have a perennial strip, you get higher compensation. Clear guidance is needed here: What is good and what is less good? Enable multiple effects from interventions – exploit possible synergies between climate mitigation and biodiversity conservation e.g. by letting catch crop /intercropping flower and

The payment should be based on performance and needs to be linked with an environmental benefit for society. High proportion of DP should be ring-fenced for Ecos-schemes Payments for environmental services should follow the same principles in P1 and P2, namely, additional costs or income forgone. It will be very confusing otherwise. More generous compensations for presumably less demanding activities in P1 create, furthermore, wrong incentives.	thus bind carbon and benefiting functional biodiversity at the same time. Allow more types of catch crops/ intercroppings. Encourage multiannual interventions, e.g. communicate that strips can be kept at one location over several seasons, encourage the use of perennial plants (as suggested by SJV, 2020-11-09)
---	---

b) During implementation (e.g. on a MS level -> strategic plans or on a lower implementation level):

EU level	Your Member State (/region)
	Implementation should be coupled with information on benefits for biodiversity and potential for ecosystem service enhancement, including agricultural production benefits. There is a need for follow-up after implementation Specific requirements should be chosen to achieve multifunctionality, e.g. intercropping could give multifunctionality (added benefit for biodiversity) if implemented so that they are allowed to flower. For „<i>Blommande slättbygd</i>“ (flower strips): Make sure their flowering season lasts long enough to cover the period when pollinators are in most need of additional nectar and pollen resources (as these are scarce in the landscape otherwise). According to the current proposal, they may be cut already from July 1st. From the pollinators perspective, it would be better to allow cutting first from September/October.

Specific questions:**Q2.1: What are the pros and cons of a closed list-based approach (menu of options)?**

Pros	Cons
Know the options. Can include only options with support for biodiversity benefit. Easier for EU to control.	Inflexible to farmers own interest and creativity. Reduce heterogeneity in actions, which in itself reduces biodiversity benefits. Requires that the compensation is set based on the environmental effects (so that we do not focus on simple (cheap to create/manage) and ineffective measures, such as uncropped field edges). Otherwise there is a great risk that it will be like the EFAs (a hidden subsidy to agriculture)

Q2.2: If the EU and MSs choose on a menu option, what would you list as examples that should or should not be included? *(Please remember that measures should fit to an annual scheme and applying to an Eco-scheme is voluntary for farmers)*

a) Examples of concrete, potentially-effective/cost-efficient Eco-scheme options that should be included:

At EU level	In your MS / region	Why?
Annual flower strips.	Annual flower strips.	Flower strip benefit pollinators (Scheper et al. 2013 Ecol Letters). It is a flexible option to increase flower resources to support pollinators. Easy to include in standard farm management and on an annual basis. Can be implemented on non-productive land as well as on crop fields. Incentivise the use of native species, which is often more expensive.
Perennial/ multiannual flower strips	Establishment of perennial/multiannual flower strip.	Same motivation as above. Higher payment than above as the effects for biodiversity is expected to be greater.
	Grass-legume ley or forage legume strips left for flowering for a year.	Same motivation as for annual flower strips. Particularly relevant in crop dominated regions that lack an abundance of alternative forage habitats.

	Environmental fallows	Increase habitat contrast in cereal dominated landscapes.
No/less hazardous chemical pesticide use for a year. Specific option for flowering crops to support pollinators.	No/less hazardous chemical pesticide use for a year. Specific option for flowering crops to support pollinators.	Reduce use of pesticides, particularly of the more hazardous, and pesticide exposure to pollinators. Hazard classification can follow EPAs, where > 11 µg a.i./bee is classified as practically non-toxic to (honey) bees. Related to pesticide objectives of both the Biodiversity strategy and Farm to Fork. Payment of forgone income based on expected yield reduction.
	No/late mowing of field margins for a year.	Simulate meadow management. Promote shelter for biodiversity and nesting for small mammals and bumble bees.
	No-till for a year	Try it out option with incentive.
	<u>Restoration</u> of wetlands or pastures	Could be combined with AECMs afterwards.

b) Examples of concrete, ineffective or problematic or cost-inefficient options that should not be included:

At EU level	In your MS / region	Why?
	<u>Standard option</u> fallows, N-fixing crops or catch crops.	These options have had a great uptake as EFAs (Cole et al. 2020 J Appl Ecol), but could be modified to have a greater biodiversity benefit. N-fixing crops can provide forage for pollinators, particularly in crop dominated regions that lack an abundance of alternative forage habitats.
	Organic farming	Because organic farming allows less abiotic inputs and rely more on ecological processes to handle fertilization and pest management,

		there is a greater need for system change and long term planning. This makes the full implementation of organic farming unsuitable for an annual Eco-scheme.
--	--	--

Q2.3: What are the pros and cons of a top-up payment versus income foregone? What would you recommend and why?

Pros	Cons
More farmers likely to enter environmental schemes (e.g., intensively farmed regions where forgone profits can be very high).	Farmers do not benefit from doing the right thing. Paying according to different principles in P1 and P2 creates confusion and wrong incentives.
The payment should be based on performance and needs to be linked with an environmental benefit for society. Important to take into account that activities with high environmental benefits may be very costly. If payments do not reflect differences in cost, those activities will not be performed. The relevant cost concept here is opportunity costs, which are difficult to observe.	

Q2.4: How should Eco-schemes best be organized spatially, among themselves and with respect to AECM? Please consider: How can this be promoted by the EU and administrated by MSs? How to balance cost-efficiency of the measure (focus on hot spot) vs. Broad scale application?

There needs to be an „ecological“ plan for the benefits that should be achieved, important to couple for example nesting (mainly AECM) and forage (both AECM and Eco-schemes) resources for pollinators. Collaborations among neighbours should be promoted. Endorse schemes that target agricultural plains („slättbygden“; intensively farmed areas) to increase ecological contrast

Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?

S.M.A.R.T.: “Specific, Measurable, Ambitious/attainable, Realistic, Time bound”

Note: The Biodiversity strategy requires a) 10% landscape features, b) expansion of organic farming to 25% UAA and c) reduction in pesticide (impacts) by 50%.

What key factors and considerations should be made by MSs when setting targets in their CAP strategic plans, and how should the EU guide and assess them?

EU level	Your Member State (/region)
Support in the foundation for distinct links between strategies, targets and actions! Support on how to assess targets and what to measure. Set clear and specific targets, and support MS in how to interpret non-specific targets in an operational way! Unclear and non-specific targets at EU-level transfers a lot of responsibility to individual MS's to interpret targets and thus, makes it difficult for MS to implement in a good/efficient way. Currently, targets focus mostly on administrative and bureaucratic indicators. Indicators that focus on desired impacts (the environmental and social benefits, for example, reduction in greenhouse gas emissions achieved) should be used. See Figure 4 in Scown and Nicholas, 2020 (https://doi.org/10.1017/sus.2020.5). Evaluate strategic targets based on actual outcome. Provide evidence-based support for MS to guide implementation Demand quantification of the environmental and climate effect of interventions chosen by MS Clarify how EFAs (=arable land) are supposed to be included in GAEC 9 (concerns conservation of existing/"natural" landscape features), and what would be needed on top of that?	Clarify links between national and EU strategy-documents and set targets, chosen interventions and their implementation requirements in the strategic plans Evidence-base is important and should be clearly described in the motivations for choice of interventions and requirements Clarify how EFAs (=arable land) are included in GAEC 9 (concerns conservation of existing landscape features), and what would be needed on top of that?

Specific questions:

Q3.1: What should count as “ambitious” targets? (how do you measure ambition?)

The ambition should be to not only halt biodiversity decline, but to reverse to an increase! Above what is expected from current trends? E.g. beyond the expected annual growth of 5-6% of the organically managed land in Europe.

Clarify links between targets and the effect of interventions – not only qualitatively, but also quantitatively

Some of the recent EU strategy documents (Farm-2-Fork.strategy, Green Deal, Biodiversity strategy) have ambitious targets that should be clearly linked to national strategies and interventions in the strategic plans.

Use back-casting to choose interventions! Which targets should be achieved, and when – and which interventions are needed in order to achieve these targets in time?

Map how and where the (environmental and climate) problems are created, and specifically target policies or interventions towards these areas/activities. This should be done both at EU-level, and at MS-level. We need both carrots and sticks: we have to look both at what is working well and how to expand it (the current focus of most policies), as well as what is most problematic and how to reduce it (which we have to stop avoiding, and instead find policies to do so fairly). In the case of greenhouse gases, agriculture should be aiming to cut emissions at least 50% by 2030. Currently most emissions come from areas of intensive livestock raising (see Figure 2C in Scown et al. 2020, [https://www.cell.com/one-earth/fulltext/S2590-3322\(20\)30355-9](https://www.cell.com/one-earth/fulltext/S2590-3322(20)30355-9)), so emissions from these areas must be reduced through both best practices in farming, and through reducing the total number of livestock in line with both health and environmental goals. The focus at the EU level needs to be on the most important areas to meet the EU-wide targets for climate (e.g., intensive livestock in Denmark, Netherlands, UK, Ireland) and biodiversity (the highest nature value farmland is in southern Europe, Mediterranean regions, and in Scotland- see Scown et al. 2020, Figure 2F).

Q3.2: How should baselines be defined? (e.g. in terms of year, UAA/habitat cover etc.)

Support should not be given to meet minimum requirements, but to actions or results that are done/achieved on top of that.

Baselines may be needed at both EU and MS-level. In order to set relevant baselines, identify problem areas (at EU and MS-level), set specific baselines for these areas and decide n targeted actions.

Examples for Swedish challenges that need to be targeted: abandonment of semi-natural grasslands, limited crop rotation/composition in intensively farmed regions.

Introduce “emission trading system” in areas with high emissions.

In line with existing policies, e.g., EU’s climate target relative to 1990; biodiversity to stop decline by 2020 in line with Aichi. No need to reinvent the wheel.

Q3.3: What should the EU demand from your MS to clarify in its targets?

Distinct links between the identified targets and the effect of the interventions chosen to meet these targets (both qualitatively and quantitatively).

How to follow up on reaching the targets (how to assess, what to measure – here EU should give support!!).

All MS must use a standard label to report their spending (for example, the Roman Numeral measure number such as "IV/A.15" to indicate "Agri-environment-climate," in addition to whatever local language and labels are used, so that payments can be matched to measures.

Q4: How can science contribute on indicators and the way they are used for performance evaluation of the CAP?

Note that the CAP comprises Output, Result and Impact indicators and in the next period also Complementary Result Indicators (CRI). Annexes are closed but a) methods can be improved and b) the CRI requires indicators for biodiversity.

Specific questions:

Q4.1 How can landscape features be best mapped? (Impact indicator to be used in the next CAP. Needs to be up to date, detailed)? It is feasible in your country?

Indicator	Justification	For which MSs?
Indexes that describe the structural complexity of the agricultural landscape, e.g. the element of more or less natural habitats (permanent habitat)		
Information on animal husbandry – geographical distribution of production	The fact that we need to bring together animal and crop production.	
Land cover, soil loss, soil quality, soil organic carbon	Identified in study of existing indicators between EU policy, research, and practice. See Figure 3, Scown et al., 2019 PNAS. (https://www.pnas.org/content/116/11/4911)	

Q4.2 How can the methods for biodiversity indicators be improved, for the habitats and species of the Habitats Directive? (Impact indicator to be used in the next CAP). It is feasible in your country?

Indicator	Justification	For which MSs?
What <u>results</u> have we got? Follow-up must be based on systematic follow-up of biological diversity in the agricultural landscape with a reasonable taxonomic span	It must be clear what the goal is, and it must be measurable i.e. how is biodiversity affected? Not just how many hectares we have in the different types of measures + farmland bird index.	
Model estimates for e.g. carbon storage	Soil processes are very complex and take long time before measurable results can be obtained in fields. Models are a way to generate evidence of impacts based on the best available knowledge that is synthesised in models (e.g., see Bartkowski et al. 2021).	
Expansion of agricultural areas, ecological buffer strips, habitat reclamation, pesticides, species diversity	Identified in study of existing indicators between EU policy, research, and practice. See Figure 3, Scown et al., 2019 PNAS. (https://www.pnas.org/content/116/11/4911)	

Q4.3 What are the best biodiversity indicators that can be proposed for the Complementary Result Indicator (FA 4A)?

“Restoring, preserving and enhancing biodiversity, including in NATURA 2000 areas, and in areas facing natural or other specific constraints, and high nature value farming, as well as the state of European landscapes”. See also here: https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/complementary-result-indicators-pillar-ii_en.pdf

Note: such indicators should be feasible to collect and analyse in multiple MSs, they have a running monitoring system and available data, and can clearly interlink CAP interventions with

observable biodiversity impacts. Indicators exist on different levels: farm-level, regional-level and member state- level)

Indicator (please note the kind of indicator and at which level your indicator is used)	Justification	For all MSs?
Systematic monitoring of biodiversity in agricultural landscapes with a reasonable taxonomic span. In Sweden there is a need to expand biodiversity monitoring, to sufficiently target agricultural land. The monitoring of birds and butterflies should be extended to properly cover the agricultural landscapes. There is an EU wide monitoring program for soil biodiversity		
A systematic evaluation/monitoring of the <u>individual</u> measures is needed. What are the real environmental effects, the effects on biodiversity? Such a systematic evaluation can include a BACI (Before-After-Impact-Control) study design, where selected entities (such as fields or farms) that do (Impact) and do not (Control) implement a measure are evaluated for biodiversity and/or environmental outcomes before and after implementation of the measure. This can be built in and part of the requirements for the Eco-schemes/ACEM.	Will increase cost-efficiency in the long run. It is extremely important to know that measures have an actual effect. It is important to look at the individual measures. It is important to be able to separate the effects of individual measures and the entire program, and other types of changes ex. climate change Counterfactual modelling is needed to separate effects of CAP (or specific interventions within CAP) from the effects of other things that happen at the same time (goes for both biodiversity and other goals). Monitoring alone will not be enough!	
General comments: 1) A well-functioning follow-up and evaluation are important to ensure the cost-efficiency of all types of interventions. An increased budget for follow-up and evaluation is needed to make sure that cost-efficient interventions can be chosen based on available evidence. 2) Specific goals and targets should be set for each intervention to ensure both suitable implementation/requirements, and sound evaluations.		

Reply Austria*

Workshop facilitators: Stefan Schindler, Elisabeth Schwaiger, Sebastian Lakner, Helmut Gaugitsch

Participants: Robert Ablinger (Landwirtschaftskammer Oberösterreich), Karl Bauer (Landwirtschaftskammer Österreich), Lara Brencic (Landwirtschaftskammer Kärnten) Franz Eberharter (Landwirtschaftskammer Tirol), Julianna Fehlinger (ÖBV – via campesina), Christian Fletschberger (Landwirtschaftskammer Salzburg), Bernhard Föger (Agentur für Gesundheit und Ernährungssicherheit), Sarah Gallob (BMLRT), Veronika Gaube (BOKU Wien), Matthias Janko (BMLRT), Jochen Kantelhardt (BOKU Wien), Reinhard Kreiseder (Landwirtschaftskammer Salzburg) Christof Kuhn (Birdlife Österreich), Gabriele Obermayr (BMK), Gerald Pfiffinger (Umweltdachverband), Christoph Plutzer (BOKU Wien), Christine Pühringer (Naturschutzbund Österreich), Andreas Schlager (Landwirtschaftskammer Niederösterreich), Johann Schmid (Landwirtschaftskammer Salzburg), Bettina Schwarzl (UBA), August Strasser (Landwirtschaftskammer Steiermark), Elisabeth Süßenbacher (BMLRT), Erich Tasser (Eurac Research; Universität Innsbruck) Thomas Weber (Landwirtschaftskammer Österreich), Lukas Weber-Hajszan (BMLRT), Manfred Weinhappel (Landwirtschaftskammer Niederösterreich), Thomas Wrбка (Universität Wien), Thomas Zuna-Kratky (Universität Wien)

Workshop date: 12.11.2020

* The Austrian workshop received a large share of stakeholders (NGOs, farming organizations, governmental organization representatives, but also independent experts) and should therefore be considered as a stakeholder workshop. For this reason, it is indicated where appropriate, which statements were done by particular stakeholders such as members of an NGO or by a farming association.

Q1: How can the different Green-Architecture elements optimally complement each other?

The following specific questions were presented and elaborated at the beginning of the session:

- **Q1.1:** Which kind of measures shall the instruments provide?
- **Q1.2:** How should the measures of different instruments complement each other to obtain a maximum of effect and synergies?
- **Q1.3:** Following which kind of quality criteria should the EC evaluate the MSs CAP Strategic Plans?

Statements from technical experts:

For livestock grazing, it is important to set quality criteria. Maintaining livestock grazing is a climate measure. We need to know exactly which grazing system is used for how many days so that the effect can be assessed precisely.

Statements from representatives of farming associations

- it is important to have a balanced combination between mandatory and voluntary measures. Strong voluntary measures with an incentive component are particularly important here. The focus here should be on the first pillar.
- What is important in the assessment of the impact of measures is what the farm manager can decide and directly influence. This is crucial for the choice of indicators. An important difference is if the measures are assessed in advance (ex-ante) or during implementation (ex-post). A distinction should be made between these two assessments.
- Too high a starting level in terms of conditionality could be dangerous for the farms because they are already at risk from the economic point of view. Therefore a rather low starting level should be chosen
- It is important that the Eco-schemes are broadly effective so that as many farmers as possible participate. Simple implementation is also important.
- The following measures are proposed by the LWK as measures in AT: – Annual greening (catch crops) to reduce erosion and promote biodiversity. – Animal welfare could be promoted through pasture subsidies. – Flower strips and fallow land (perennial) should rather be in the second pillar.

Statements from NGOs

- Eco-schemes could be a valuable contribution for the environment in MSs that have little money allocated in pillar II. Relevant programs in eco schemes could be such that make sense also for one year only, such as Skylark windows or upgrades/add ons for species conservation measures in pillar II.
- It might make sense to subsidize small farms or to subsidize farms which are labor intensive and this would also benefit mountain pastures
- The conditionality is a kind of legal framework. The question arises as to why farmers are subsidized for complying with the law?
- For the Eco-schemes it seems important to develop “tailor-made measures”.
- The WTO criteria on competition are the basis of the compensation system. This is a main problem, and a reason for lack of progress in nature conservation.
- The Austrian AEEM ÖPUL is a good program, but there is still room for improvement.

- The important question seems to be what happens in the intensively used regions. How to promote there agri-environmental measures?
- Catch crops / greening have hardly any positive effects on biodiversity, so they are not a useful instrument.
- A low base line [related to conditionality] could actually be disadvantageous for Austria because the legal framework conditions are rather strict in Austria. In this respect, the demand for a low starting level by some Austrian stakeholders is incomprehensible.

Q2: What should be the specific role(s) of Eco-schemes in the Green Architecture, and accordingly, how could they best be designed and implemented?

The following specific questions were questions were presented and elaborated at the beginning of the session:

- **Q2.1:** Advantages and disadvantages (for agriculture and for biodiversity) of a closed list of options for Eco-schemes
- **Q2.2:** Which options that should be included, which should be disregarded?
- **Q2.3:** Advantages and disadvantages of payments for income forgone versus top-up payments (incl. aspects of result-oriented payments)?

Statements from technical experts

- Eco-schemes should promote alpine pasturage and herding (especially personnel support), e.g. to conserve extensive grazing (which has a positive impact on biodiversity)

Statements from representatives of farming associations

- It is important to determine what is mandatory in the Eco-schemes, which should then be built upon in the following. Eco-schemes and Austrian AECS ÖPUL should be thought together and complement each other
- the question is, which structure of businesses would Austria like to promote in relation to livestock farming. Small scale agriculture and extensive grazing should be promoted in the Eco-schemes.
- broad-based measures are to be included in the Eco-scheme, so that many farmers can benefit from them

Statements from representatives of NGOs

- Eco-schemes as a kind of secondary/complementary AECM, potentially relevant, as not all member states have a strong 2nd pillar; the promotion of annual nature conservation measures would be well suited for Eco-schemes, which should allow for regionalization and could for example focus on:
 - nest of Quail (*Coturnic coturnix*),
 - Lapwing (*Vanellus vanellus*) on corn fields,
 - “skylark windows”,
 - Wet meadows,
 - lower seeding densities,
- financial topping (of the funding from the Austrian AECM ÖPUL) for particularly endangered species.

- It would also be important to buffer the transition years (in the event of a suspension of measures) between two funding periods.

Q3: How can the EU and MSs set S.M.A.R.T. targets that are coherent both with the CAP objectives and relevant strategies (Farm-to-fork, Biodiversity)?

The following specific questions were presented and elaborated at the beginning of the session:

- **Q3.1:** What can be considered as „ambitious“ and how can it be measured?
 - **Q3.2:** What can be considered as „ambitious“ and how can it be measured?
 - **Q3.3:** Which reference values are to be used?
-
- **Statements from technical experts**
 - The 50% pesticide reduction target could be interpreted as SMART, because it is a specific number and it is specified that amount and risk must be reduced. But on closer inspection there are several uncertainties, e.g. which substances should be considered, what's the baseline, active ingredients or commercial products to be measured, etc.
 - Green infrastructure indicators are suitable, as they address the functioning network of natural landscapes.
 - Landscape structure indicators are technically feasible and measurable (sentinel data), they are relevant for climate protection, erosion protection, stepping stone structures
 - 10% landscape and biodiversity elements? Could be implemented in AT in a stepwise approach – voluntary AEEM rail at least 7%, incentive up to 20%, this should result in an AT average of 10%, but regionally different.
 - **Statements from representatives of farming associations**
 - A challenge are the causal relationships between agriculture and the measured impact on biodiversity, an overall scientific assessment is necessary for this, activities that the farmer can be responsible for on their own land must be considered, but also the holistic view must be taken into consideration
 - For the assessment of whether the goals are realistic, the impact-oriented impact assessment of the EC is still missing; for the farmers, the orientation of the European internal market towards third countries is relevant
 - Target on 25% organic: this is already achieved in AT, and could be increased by the farmers, but, importantly, there must always be a demand track.
 - Coherence of the GAP with F2F and Biodiversity strategy goals is questionable, contributions to climate protection are not to be questioned, but rather "mandatory"

Q4: How can science contribute on indicators and the way they are used for performance evaluation of the CAP?

The following specific questions were presented and elaborated at the beginning of the session:

- **Q4.1:** Appropriateness of the new CAP indicators I.19 and I.20
- **Q4.2:** Usefulness of the HNVf indicator
- **Q4.3:** Which biodiversity indicators are most as „Complementary Result Indicator“ (FA 4A)?

At the beginning a discussion on indicators emerged; experts suggested indicators to be presented in a regionalized manner, as Austrian regions differ very much in terms of natural features and prerequisites; others mention the “distance to nature” (hemeroby) indicator, which is available for all of Austria. It indicates the degree of naturalness – if a region is cultivated very intensively, measures must / could be taken to counteract this; again others requests specifications on CAP I.19 and mentions that is also important that indicators are easy to use in practice.; others mention the challenges of loss of extensively managed grassland and land abandonment.

Statements from technical experts

- The “Farmland Bird Index” is shown for many regions in Austria. Regionalization of the indicators would be important for a more precise assessment. The situation of biodiversity in Austria is very different. Therefore, one would have to set regional goals, for example for floodplains or for alpine pastures, and examine these with regionally specific indicators.
- An interesting indicator could be the “distance-to-nature” indicator. This indicator is currently being tested in western Austria (Tyrol). The indicator measures the distance to near-natural elements and has been tested in grassland and orchards. For example, landscape elements were planned based on this index.
- The important question would be where the data for the time series for I.19 come from and how these time series are examined. Its also important that an indicator should be easy to use in practice.
- The Farmland Bird Index is important for biodiversity aspects. But such indicators are lacking in other groups of organisms than birds, so if necessary one should switch to land use types as an indicator. Some land use types go hand in hand with a high level of biodiversity, e.g. different kinds of extensive meadows in lowland and mountains, fallow land in arable fields.
- Land use types are considered in Austria within the Austrian HNV indicator. In this respect, the HNV farmland indicator is actually an interesting indicator, which, however, is no longer an obligatory GAP evaluation indicator.
- I.19: This indicator is very straight forward. The basis is the national reports in accordance with Article 17 of the Habitats Directive: Only those habitat types and species that are

closely related to agricultural use are evaluated. In analogy, this can be done for the Birds Directive

- Land abandonment is indeed an important challenge. Funding via ÖPUL should not, however, give up these areas; on the contrary, it is the responsibility of funding to encourage that this land remains in use.

Statements from representatives of farming associations

- An indicator should be easy to measure and map a large proportion of land use. An important challenge for the above-mentioned land use types is land abandonment. A lot of biodiversity-rich areas are lost this way.
- I-19: This indicator is outside the sphere of influence of agriculture and is therefore not suitable.

It is important that the compensations in the agri-environmental measures have a profit mark-up so that it is more attractive to farmers to keep on

ANNEX II: Opinions on the Flagship-Eco-schemes

Comments on the Eco-schemes Flagship Agroforestry

As a follow-up to the workshop, an online survey was developed to enable individual replies by scientists and other experts, beyond the inputs collected at the workshops. The survey was open for inputs between mid-December 2020 and end-March 2021. From the survey inputs, we harvested comments on the flagship Eco-schemes proposed as a Non-Paper by the Commission and the Council (WK 10899/2020 INIT)

	Agroforestry
Austria	• Agroforestry is potentially effective on land where the shadow does not infringe crop/grass growth. • Agroforestry: effective only in landscapes with low shares of semi-natural land (landscape elements); ban of inputs (and even mowing) in tree rows at least • There needs to be solid scientific evidence about the effectiveness and tangible environmental benefits
Denmark	• Agroforestry in terms of support for hedgerows will enhance the ecological conditions (reduce erosion, increase natural pest management, biodiversity etc)
Estonia	• Effective only, when their applications are assured for decades. Otherwise, temporary face-lift. • Agroforestry and Agro-Ecology should cover some minimum threshold of arable land.
Finland	• Agroforestry is not a realistic option in Finland; Carbon farming could be, as Finland has lots of fields on peatlands.
Germany	• Requirements for agroforestry should be a multi-year commitment to the practice from the farmers, and long-term support payments (incl. startup costs). Agricultural rules and regulations need adjustments to allow this practice to develop and spread. Extension systems and research on agroforestry should be supported, since this is relatively new and many farmers hesitate to venture into uncharted territory. • Agroforestry: very relevant in eastern Germany because of field size, in the west mostly not relevant because of the (very) small field structure (boundaries already exist in terms of hedges, streams, etc.), Effective, efficient: multiple and regional use of woody perennials, big field size, trees/shrubs depend on conditions such as soil indicators etc. (which environmental dimension do you want to support, thus which tree/shrub is most efficient for which purpose), • Agroforestry esp. in regions prone to wind erosion

	Agroforestry
Ireland	• Agroforestry is only feasible if it rewards existing woody features in the landscape and puts a value on these. It is not realistic to expect farmers to devote land to trees on the basis of an annual payment which may not last. The same applied to re-wetting of peatlands. These are good agri-environmental measures but require long term planning, investments and commitments. Eco-scheme could be used to put a value on existing high value environmental features raising the status of this land and value of it to the farmer, thus incentivising its retention and improved management in combination with targeted agri-environmental schemes. Essentially Eco-schemes should secure the quantity of green architecture- increase this where it is below a certain threshold resulting in securing green infrastructure across the agricultural landscape under pillar 1, building on this in pillar 2 with measures to support greater quantity and enhanced quality of entire network. There is simply too many unfocused Eco-scheme measures in the commission non-paper, many not suitable for annual measures.
Italy	• There is potential overlap, e.g. between agro-ecology, agroforestry and carbon farming. All four flagship Eco-schemes should have as backbone the diversification of cropping and farming systems. Precision farming and conservation tillage not framed in a context of diversified systems should be taken out from flagship Eco-schemes.
Netherlands	• Agroforestry is more a niche, and needs more stimuli.
Portugal	• Agroforestry and agro-ecology should be the priorities and proposed in combination • Agroforestry should be priority in the C and S of the country. Precision farming in the main river corridors.
Slovenia	• I think there are national institutional measures preventing large-scale agroforestry, so probably the legislative framework would need to be reworked. I don't know enough about these systems to give any kind of reliable answer. • Agroforestry in the dryer parts of the country
Spain	• Agroforestry and carbon farming should be ineffective if they introduce too much woody vegetation into open arable and grasslands systems dominated by steppic species. • Agroforestry may be harmful in open-field valuable areas, its design must be carefully studied.

Comments on the Eco-schemes Flagship Agri-Ecology

As a follow-up to the workshop, an online survey was developed to enable individual replies by scientists and other experts, beyond the inputs collected at the workshops. The survey was open for inputs between mid-December 2020 and end-March 2021. From the survey inputs, we harvested comments on the flagship Eco-schemes proposed as a Non-Paper by the Commission and the Council (WK 10899/2020 INIT)

	Agri-Ecology
Austria	• Agro-ecology should be pursued on all agricultural land since it allows for conventional farms to adopt sustainable farming practices without the necessity of going organic. Undersowing in e.g. cereals with feed legumes could also release synergies between sustainable crop production and the provision of livestock feed (however, the definition of agro-ecology is ambiguous). • Agro-Ecology: likely too general to become effective, difficult to enforce since it depends on numerous daily management decisions • The most efficient, in my opinion, is Agri-Ecology. The main aim should be to reduce intensification and abandonment of low input practices. Experiences in Austria show that, additionally environmental measures must cover over 80% of agricultural area and over 10% of dark green measures. An incentive for farmers which exceeds income foregone is essential.
Denmark	• Agro-ecology is not really what it claims it is • Agri-ecological measures may be effective in promoting organic farming, promoting green infrastructure
Estonia	• Measuring effectiveness of agro-ecology and carbon farming remains a big challenge.
Finland	• Agro-Ecology: we need a comprehensive package to support farmers to transition to whole-farm agro-ecology principles. This can be modelled after the young farmer support package.
France	• Missing for transition to agri-ecology and animal welfare: reduction of pesticides according to toxicity, antimicrobials and certain harmful veterinary products, reduction of GHG, animal welfare • Agro-Ecology would require to be defined properly with a number of indicators as it is very vague: should at least require a substantial reduction in chemical use, gradual over the 4 years of the CAP programming

	Agri-Ecology
Germany	• Scientific evidence suggests that ecological intensification, i.e. the application of ecological (and evolutionary) rules to agriculture will be the most effective to guarantee sustainability. The most prominent is that diversity begets stability, i.e. diversification at all levels (between farms, between fields, within fields) will be a key measure that does not even cost much (even not in terms of machinery), it just needs incentives - not sure which of the four empty buzzwords above would include this measure, probably Agri-Ecology • Agro-ecology: Every farmer would say that he or she "produces food in harmony with nature, not against it", this needs to be clearly defined, what is an adequate soil coverage over year, mixing crops in what way etc. Effective, efficient: It would be efficient if the approach is better defined (what is the exact goal and which are the measures) • These are pretty vague options, especially "agri-ecology" and "carbon farming". In any case, I consider tailored programmes specific to site conditions (or, alternatively, result-based payments) as essential given the biophysical, economic and social heterogeneity of agriculture. • Agro-ecology should be the umbrella over everything • Instead of 'agro ecology', the option should be 'organic farming' • The four options on a small scale wouldn't change anything; e.g. agri-ecology: clear definitions for management options are needed. • Agro-ecology: very complex, only feasible as a point system with different options to choose an add together, advice should be offered
Ireland	• The definition and interpretation of the terms "landscape features " and " additional types of elements to be retained " beyond GAEC 9 in Agro-ecology Eco-scheme will be crucial to ensuring the applicability of the agro-ecology flagship Eco-scheme to the valuing existing undervalues elements of the agricultural landscapes which continue to be lost . It is essential that within this definition that semi-natural habitats formerly considered ineligible under CAP are included and valued. For effective biodiversity conservation, all farmed semi-natural vegetation and landscape features should be valued as one progresses through the GAEC, Eco-schemes and AECM.

	Agri-Ecology
Italy	• For agroforestry, precision and carbon farming it is possible to identify accurate practices. the agro-ecology is still "fuzzy". Therefore both the design and justification of "fuzzy measures", make agro-ecology (as a whole) very unfeasible within the Eco-schemes. • There is potential overlap, e.g. between agro-ecology, agroforestry and carbon farming. All four flagship Eco-schemes should have as backbone the diversification of cropping and farming systems. Precision farming and conservation tillage not framed in a context of diversified systems should be taken out from flagship Eco-schemes.
Lithuania	• Semi-natural wood pastures (lost habitat of high biodiversity) and perennial flower strips (lost resource for pollinators) -> Both points may be considered as essential parts of the Agri-Ecology
Netherlands	• All potentially work well, but definitions should be clear. Agro-ecology is a broad term. agro-ecology and carbon farming: farmers may be interested, but they need to be able to earn money and be entrepreneurs.
Portugal	• Agroforestry and agro-ecology should be the priorities and proposed in combination
Romania	• Agro-ecology seems to be the most appropriate for the conditions from Romania considering all the linked aspects: social, economical, cultural, traditional, educational etc.
Slovenia	• Agro-ecology needs to be supported by wide and intensive AKIS to differentiate between putative and actual good practices.

	Agri-Ecology
Spain	• Agri-ecology and precision farming may have negative side effects on many organisms depending on infrastructure needed to compensate for crop losses due to reduced chemical inputs. Landscape-scale designs aimed at mixing adequate field edges (either woody or herbaceous), seminatural vegetation (including permanent grasslands), covered fallo, and crops is the main missed flagship option I think that the flagship Eco-scheme options should be linked to specific practices. • For example, for agro-ecology, some practices could be suggested and a specific % of them should be required to receive the payment: - No tillage or reduced tillage - High diversity of crops - No agrochemical use - Application of internal (residues from harvest and pruning debris) and external (compost, manure, organic by-products...) organic inputs

Comments on the Eco-schemes Flagship Precision Farming

As a follow-up to the workshop, an online survey was developed to enable individual replies by scientists and other experts, beyond the inputs collected at the workshops. The survey was open for inputs between mid-December 2020 and end-March 2021. From the survey inputs, we harvested comments on the flagship Eco-schemes proposed as a Non-Paper by the Commission and the Council (WK 10899/2020 INIT)

	Precision Farming
Austria	• Precision farming; eventually helpful with some risks of intensification on parts of the area; may overestimate effectiveness due to intentions to save resources anyway; • Precision farming could also simply lead to more efficient intensive land use, without really improving environmental conditions sufficiently.
Belgium	• Precision farming should NOT be an Eco-scheme and should not be funded. This should just be good practice for a very long time.
Denmark	• Precision farming is only a temporary measure - mostly driven by the desire to continue traditional, chemical-intensive cultivation, only with more precision. This does not make this cultivation system sustainable. • Precision farming should not be part of Eco-schemes
Estonia	• Precision and carbon farming is relevant for most of the arable land. • Measuring effectiveness of agro-ecology and carbon farming remains a big challenge.
Finland	• Precision farming is mainly targeted toward maintenance of large-scale industrial farming. While it is probably effective in comparison to non-precision industrial farming, I do not consider it the best model for the future of agriculture, as it essentially perpetuates a technological agri-business as opposed to agri-cultural worldview of food production.
France	• Precision farming should also be associated with compulsory reduction of chemicals, the need to assess semi-natural infrastructures or minimum surface of ecological focus area

	Precision Farming
Austria	• Precision farming; eventually helpful with some risks of intensification on parts of the area; may overestimate effectiveness due to intentions to save resources anyway; • Precision farming could also simply lead to more efficient intensive land use, without really improving environmental conditions sufficiently.
Germany	• Don't include Precision farming. It will be covered by technical development: no extra payments! Investment support in pillar 2 possible. • Precision farming technologies: these technologies only have the desired effects when used correctly. The basis for a subsidy must therefore be a measurement of the achievement of the objectives and not of the acquisition or similar. • Precision farming is far from guaranteed that this will produce environmental benefits. Specific interventions under a precision farming umbrella may deserve support, but policies would need to be much more specific here. • Precision Farming: PF often seems a little overrated to me, Efficient, Effective: This would be more efficient if not every farmer buys the newest (heavy) agricultural machinery, but if this is done predominantly by contractors/farmer associations/borrow or share concept, etc. The NL (farmer collectives) way is very interesting as well. • These are pretty vague options, especially "agri-ecology" and "carbon farming". In any case, I consider tailored programmes specific to site conditions (or, alternatively, result-based payments) as essential given the biophysical, economic and social heterogeneity of agriculture. • Precision farming should become GAEC requirement, and support can be transitory only • Precision farming: not advisable as Eco-scheme in Germany, is in many regions already good practice, in order to introduce it in regions, where not often used yet information, advice and pilot projects are useful offers to hire equipment
Ireland	• The Precision Farming flagship has strong potential to favour more productive farming. the development and deployment of precision farming for the delivery of ecosystem services in e.g. HNV farming systems would be very desirable. Precision farming currently seems to be only targeted at high value products from intensive farming systems.

	Precision Farming
Austria	• Precision farming; eventually helpful with some risks of intensification on parts of the area; may overestimate effectiveness due to intentions to save resources anyway; • Precision farming could also simply lead to more efficient intensive land use, without really improving environmental conditions sufficiently.
Netherlands	• It is not so much the nature of the farming system but the way in which it implemented. For example, precision farming may reduce agrochemical emissions but could also have severe negative effects on farmland biodiversity if it is implemented in an intensive way because it will mean that there will be less resources for biodiversity on agricultural fields. Therefore flagship Eco-scheme options shouldn't be included. • As many farmers in the Netherlands are export-oriented and intensive, the first main option is precision farming. The average farmer may be most interested in that.
Poland	• The essential issue is to have a well-managed agriculture sector with the intensity of agricultural production adjusted to local environmental conditions. This would allow decreasing land area needed purely for food/feed production and start to produce public goods where it would be effective. Precision farming would be very helpful to avoid environmental pressures. Rest of the land of lower quality could be used for generating public goods e.g. agroforestry/carbon farming etc. The idea of organic or fertilizer&pesticide-free agriculture is becoming more popular, however, it seems to be very naive to believe that low-input agricultural systems are eco-efficient. It will just require much more land and effort and finally can produce much higher GHG emissions. • Precision Farming is the most promising in my opinion, allowing to optimise current resources usage and brings environmental and economic benefits. The problem in implementation in Poland may be the small scale of production, while for the efficiency of this scheme larger scale is required. With generally low environmental awareness in Poland programs bringing only environmental, not economic benefits maybe not so popular. • Conditions for efficiency and effectiveness of mentioned programs are: high and improving knowledge of farmers on agricultural (agro-environmental) practices, balance between economic and environmental effects for farmers as economic results still remain the most important in a farm, effective R+D support for Precision farming.
Portugal	• Agroforestry should be priority in the C and S of the country. Precision farming in the main river corridors.

	Precision Farming
Austria	• Precision farming; eventually helpful with some risks of intensification on parts of the area; may overestimate effectiveness due to intentions to save resources anyway; • Precision farming could also simply lead to more efficient intensive land use, without really improving environmental conditions sufficiently.
Slovenia	• Precision farming must be supported by AKIS and investment support, as well as monitoring. Being a high-intensity practice that supports resource efficiency and high incomes, support could probably taper off after a while (but not monitoring). Economic efficiency calculations would have to be made to support this (this is only an assumption of mine). Perhaps considerations are to be made as to the maximum allowed level of intensity.
Spain	• Agri-ecology and precision farming may have negative side effects on many organisms depending on infrastructure needed to compensate for crop losses due to reduced chemical inputs. Landscape-scale designs aimed at mixing adequate field edges (either woody or herbaceous), seminatural vegetation (including permanent grasslands), covered fallo, and crops is the main missed flagship option
Sweden	• Precision and carbon farming in specialized arable cropping regions have the potential to generate substantial environmental benefits. In marginal regions the main issue is reducing GHG emissions from livestock (soils are SOC maximized since >, 75% of area is currently grassland) and preserving extensively grazed semi-natural pastures, which requires payments for maintaining traditional management (grazing) of these biologically rich pastures (ca. 20% of Sweden's agricultural area).

Comments on the Eco-schemes Flagship Carbon Farming

As a follow-up to the workshop, an online survey was developed to enable individual replies by scientists and other experts, beyond the inputs collected at the workshops. The survey was open for inputs between mid-December 2020 and end-March 2021. From the survey inputs, we harvested comments on the flagship Eco-schemes proposed as a Non-Paper by the Commission and the Council (WK 10899/2020 INIT)

	Carbon Farming
Austria	• Carbon farming needs to be adopted and also remunerated for farmers, incentive schemes could provide e.g. the Eco-region Kaindorf in Austria • Carbon farming: difficult to maintain high levels of soil organic matter, in Austria particularly important to hold these levels at least; inputs (e.g. coal) must not impact other environmental goods,
Belgium	• Develop a common carbon inventory system and Giving farmers access to the carbon market
Denmark	• Carbon farming should not be part of Eco-schemes • Depending on the content they can be useful. Important to include a focus on carbon
Finland	• Carbon farming could be possible, as Finland has lots of fields on peatlands. • Carbon farming and Agroforestry are own subsets of farming based on agro-ecological principles and can fall into such a package.

	Carbon Farming
Germany	• Carbon farming must directly address farmers working on peatlands, as they need support in becoming mire-carbon farmers. The carbon emission from agriculturally used mires are one of the most critical issues and can be addressed by giving these farmers a low-carbon emission perspective, i.e. being (financially) recognized by society for CO₂-reduction or being able to produce viable paludiculture goods with raised water levels. • Don't include Carbon farming. It should be covered by minimum conditionalities: no extra payments! Partly in national regulatory requirements. Implementation deficit. No use if only annually applied. • Carbon farming: there are differences between mineral and organic soils (mostly peatlands). Organic soils are the most efficient carbon stores which a) need to be protected and b) enabled in the best case to sequester. Paludiculture would be an option here but it most probably won't pay off for farmers just from products as high initial investment is needed and it is a pioneer approach, so farmers need remuneration for "farmed carbon", this could be provided by Eco-schemes, e.g. high one-off payment for establishment, accompanied by long term remuneration from pillar II • Optimizing agriculture specifically for carbon sequestration makes little sense in my view. C sequestration is best achieved by supporting agroforestry and agro-ecology. • Carbon farming should be a must for all. Regularly soil monitoring required; every farmer should receive subsidies when C pool increases over time, the costs being covered by fines for farmers whose C pools decrease. C sequestration is globally of utmost importance so that every country must do whatever possible for improving the balance - and agriculture is a huge lever. • Carbon farming: - conversion of arable to grassland should be supported in pillar two (permanent conversion in certain areas e.g. organic soils, in water protection areas...); - reduced tilling only does not suffice, in order to build up humus a long-term management adaptation is necessary (cover crops, multi-annual crops including leguminoses, efficient use of org. fertiliser etc.), there should be a high self-interest of farmers, therefore information and advice should be the dominant measure, e.g. supported by measurements or tools to estimate the impact of management. This could also happen within an agri-env.-climate measures with payments for participation and obligatory advice and use of measurements or tools to estimate the impact of management. Eco-schemes could support carbon farming by offering some of the measures (cover crops, multi-annual crops including leguminoses...), best within a point system - Appropriate management of dried peatland: not suited for Eco-schemes, as normally a higher water table cannot be influenced by one farmer alone. More important would be a mix of instruments in pillar two (information, planning, cooperation, securing of land, investments, areas measures for use as grassland with

	Carbon Farming
	higher water table or paludiculture) and at the same time a clear message that arable land use on organic soils will not be allowed any more in the medium term.
Italy	• Some supply chains are applying supply contracts to incentivize sustainable production. private standards concern most on these practices who can easily communicate to consumers (to get premium price). for all those reasons, I consider carbon farming more suitable at this level as can be better justify and communicate and designed at centralised level. • There is potential overlap, e.g. between agro-ecology, agroforestry and carbon farming. All four flagship Eco-schemes should have as backbone the diversification of cropping and farming systems. Precision farming and conservation tillage not framed in a context of diversified systems should be taken out from flagship Eco-schemes.

	Carbon Farming
Netherlands	• Agro-Ecology and carbon farming: farmers may be interested, but they need to be able to earn money and be entrepreneurs.
Slovenia	• Carbon farming needs to be supported by more research and monitoring. Slovenia is very diverse geologically and sequestration is not likely to be uniform across soil types. If payments are to be made based on amount of carbon sequestered, the knowledge base must be greatly expanded. Practice-based schemes, on the other hand, must be well-thought out and supported by currently available knowledge, which would probably suffice.
Spain	• Agroforestry and carbon farming should be ineffective if they introduce too much woody vegetation into open arable and grasslands systems dominated by steppic species.
Sweden	• Precision and carbon farming in specialized arable cropping regions have the potential to generate substantial environmental benefits. In marginal regions the main issue is reducing GHG emissions from livestock (soils are SOC maximized since > 75% of area is currently grassland) and preserving extensively grazed semi-natural pastures, which requires payments for maintaining traditional management (grazing) of these biologically rich pastures (ca. 20% of Sweden's agricultural area).

General comments on Eco-scheme Flagships

As a follow-up to the workshop, an online survey was developed to enable individual replies by scientists and other experts, beyond the inputs collected at the workshops. The survey was open for inputs between mid-December 2020 and end-March 2021. From the survey inputs, we harvested comments on the flagship Eco-schemes proposed as a Non-Paper by the Commission and the Council (WK 10899/2020 INIT)

	General Comments
Austria	• New flagship: closing nutrient cycles • Organic farming is definitely missing, unless it can be subsumed under agri-ecology.
Bulgaria	• The Eco-scheme are very important for Agriculture and Environment. The should be implemented from all farmers, whether they produce for the market or only for their own consumption. • In Eco-scheme should be added also water management.
Croatia	• If one of the options are implemented every of mentioned options should have a yearly monitoring
Cyprus	• My feeling is that all four options are geared towards large scale farming. In Cyprus, and many other Mediterranean/mountainous areas, fields are of small size, and the listed options do not fit well. One could argue that small scale farming follows agro-ecological principles, and increases carbon sequestration because of the presence of perennial plant species in field margins. The main problem for small scale farming is the intensification of input use, and any flagship Eco-scheme options should include one specifically addressing fertilizer and pesticide use. A major problem with the current approach for small-scale farming is that with the exception of intensive input use, small-scale farming represents an environmental target as is, in other words, the baseline is good enough. But by its definition, an Eco-scheme or an AECM requires farmers to change their practices. Altering a recipe for the sake of change does not produce better results, and in many cases leads to worse outcomes. I recognize that it is probably not possible to create an AECM or Eco-scheme for the as-is practice. Still, one should not sacrifice something that seems to be working well, for the sake of implementing something different. That is why I feel that M13 on Areas of Natural Constraints could further be used to address small scale farming. The problem with that is that at least in my own MS, the whole island is considered an ANC. The lack of significant differentiation between small scale farmers and larger, more intensive farms, threatens mountain farming because of land abandonment. Linking Eco-schemes or any other measures to the market is also crucially important. The CAP has a huge, still limited budget. It is impossible to pay for all the externalities of farming through the

	General Comments
	CAP, and inevitably consumers will need to foot part of the bill. Eco-schemes geared towards aiding farmers to increase the marketing value of their products might have a better chance of success. I am referring to certification schemes currently, and a link to the EU Commission initiative on product environmental footprint in the medium-term.
Denmark	• Mixed (plant & animal) farming is missing as a flagship option - in many marginal areas this should be encouraged. • A scheme on grassland is missing
Estonia	• Missing Heritage-rural landscaping.
Finland	• The effective allocation of the schemes is important. Maybe consider tenders (even as a pilot)?
France	• Exclude precision farming Add i) permanent grassland, ii) diversity (is this included in agri-ecology?), and iii) EFAs (excluding "productive" EFAs) Add specific Eco-scheme measures in relation with Green Deal targets • Design the payment according to the additionality compared to actual farming practices
Germany	• Permaculture would be missing in the list, but the approach may be too general. • MISSING: Certified farm sustainability management with individual - short, medium, and long term - improvement aims. Such a system (cf. https://www.origingreen.ie/what-is-origin-green/) enables the individual farmer to select the most important areas of improvement for her/his own farm, in combination with a baseline of different sustainability aspects. • Organic farmers need to get more money (because they address a lot of different environmental etc. problems) than the sum of single options farmers might choose! There must be the possibility that organic farmers can apply for other options as well without losing money (combination of different programmes are needed). • Flagship Eco-schemes should be implicitly perennial measures (e.g. organic farming) or those that promise relevant environmental benefits after the first year.
Greece	• These options require on the field technical and scientific support, support of rural communities to stay rural (facilities, infrastructure), support for fair trade of products.

	General Comments
Ireland	• The majority of biodiversity on farmland occurs on farmland types that are not classed as 'landscape features' e.g. lowland species-rich grasslands, alpine species-rich grasslands, heathlands etc. These farmland types range from farmland habitats that are considered ineligible for CAP payments to high nature value farmland. It would be important to clarify whether the scope of the biodiversity actions and improvements is limited to farmland areas classed as 'landscape features'. • There is insufficient emphasis on biodiversity, and there should have been a 'Biodiversity' flagship Eco-scheme.
Italy	• Some of the proposed Eco-schemes are already implemented as AESs, which are designed at the regional level (NUTS2). Thus this would affect the budget allocated to the region as well as the public transaction cost in design the region. For example, moving organic farming to eco schemes would reduce about 15-20% of the budget of each RDP as well as is not an easy measure to manage in term of control, inspection etc. therefore both the acceptability of shifting budget from the first pillar to the second and the public transaction cost is can affect the "ambition" of eco schemes. • Italy shows tensions among the several Regions (i.e. north vs south regions). Who will design eco schemes would be asked also to mediate the pressure group and decide politically which farming system will be charged with the ecological transition costs. this would acceptability of the measure designed at a centralised level very complex.
Luxembourg	• They could be potentially effective if applied on a large area and if farmers are supported with implementation. Farmers have to be supplied with relevant information on the implementation, opportunities & challenges. Farmers as well as agricultural advisors should be formed and educated on these options in order to guarantee their effective implementation in relevant regions. Soil quality and its optimization should always be considered. A measure is efficient only if it has a positive effect on soil.
Netherlands	• The effectiveness and efficiency of these four options are dependent on the extent these options will be widely applied over the course of the CAP period. This means that they need to be applied in different sectors and different regions to (1) show that they are widely applicable in different contexts; (2) and to show that these options can become more than a niche activity. If the goal is to ensure a larger impact by introducing these flagship options, then the EU and Member States should ensure that the options are made attractive for different types of farmers and work towards making these activities part of the norm.

	General Comments
Poland	• These options require raising the environmental awareness of farmers. • Listed options are very important in the context of the environment protection, but from the Farmer perspective the most important is the profit of selected practices. Thus, the success of Eco-schemes will be determined by the payments rate.
Portugal	• All of them could be efficient and not efficient at all. When CAP finance soil samples to farmers but the value itself of the soil sample does not have any importance at all, what can be changed? All Eco-schemes should present quantified evidences, otherwise the result will be less than nothing. If the criteria is not technical and only political the result will not be achieve in any Eco-scheme defined. So the solution is setting up a base line and after that define specific goals and after that register all the evidences to reach that specific goal.
Slovakia	• In Slovakia Eco-schemes should be specifically focused on: 1) to decrease the average area of arable land plots by semi-natural habitats (green infrastructure), 2) increase overall diversity in lowland farming by creating/maintaining non-production areas, 3) reduce intensive arable land farming, 4) change intensive management of grasslands and being more responsive to environment, 5) maintain areas of difficult access, etc. If the listed options can solve (some of) these problems they could be considered as effective. • These four options are potentially effective and efficient in case they will be applied to sufficient area and controlled annually also by a third party (especially in my state, there is a great history of corruption and receiving subsidies by people that do not use it in agriculture in the end, yet the case is stated as approved and the outcomes as checked)
Slovenia	• These systems would be suitable if clear common requirements are defined, as e.g. in the case of organic farming.
Spain	• The effectiveness of this flagship Eco-scheme options requires well-defined instructions for farmers in the way they must be implemented. Ambiguities in the formulation might cause low uptake in a voluntary measures such as Eco-schemes.

ANNEX III: BIBLIOGRAPHY/REFERENCES

References

- AECOM (2020) Evaluation of the Burren Programme. AECOM Ireland Limited. Report. <https://assets.gov.ie/98196/f13c1130-66d6-4da2-af34-378c92ccb571.pdf>
- Álvarez-Martínez, J.M., Suárez-Seoane, S., Stoorvogel, J. J., & de Luis Calabuig, E. (2014) Influence of land use and climate on recent forest expansion: a case study in the Eurosiberian–Mediterranean limit of north-west Spain. *Journal of Ecology*, 102(4), 905-919.
- Anderson, E., & Mammides, C. (2020). Changes in land-cover within high nature value farmlands inside and outside Natura 2000 sites in Europe: A preliminary assessment. *Ambio*, 49, 1958-1971.
- Assandri, G., Bogliani, G., Pedrini, P., & Brambilla, M. (2018) Beautiful agricultural landscapes promote cultural ecosystem services and biodiversity conservation. *Agriculture, Ecosystems & Environment*, 256, 200-210.
- Azcárate, F.M. et al. (2012) Drove roads as local biodiversity reservoirs: effects on landscape pattern and plant communities in a Mediterranean region. *Applied Vegetation Science*, 16:480-490.
- Babai, D. et al. (2015) Do conservation and agri-environmental regulations effectively support traditional small-scale farming in East-Central European cultural landscapes? *Biodivers. Conserv.* 24, 3305-3327.
- Bartkowski, B., N. Droste, M. Ließ, W. Sidemo-Holm, U. Weller, and M.V. Brady. (2021). Payments by modelled results: a novel design for agri-environmental schemes. *Land Use Policy*.
- Batáry, P. et al. (2015) The role of agri-environment schemes in conservation and environmental management. *Conservation Biology*, 29:1006-1016.
- Baudry, J., & Thenail, C. (2004) Interaction between farming systems, riparian zones, and landscape patterns: a case study in western France. *Landscape and urban planning*, 67(1-4), 121-129.
- Baur, I., Dobricki, M., & Lips, M. (2016) The basic motivational drivers of northern and central European farmers. *J. Rural Stud.*, 46: 93-101.
- Biggs, J., Williams, P., Whitfield, M., Nicolet, P., & Weatherby, A. (2005) 15 years of pond assessment in Britain: results and lessons learned from the work of Pond Conservation. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 15(6), pp.693-714.
- BIOGEA (2020) Policy Recommendations <https://www.adelphi.de/en/system/files/mediathek/bilder/Policy%20recommendations%20v7.0%20%28A4%20for%20pdf%29.pdf>
- Boyle, P., Hayes, M., Gormally, M., Sullivan, C., & Moran, J. (2015) Development of a nature value index for pastoral farmland-A rapid farm-level assessment. *Ecological Indicators*, 56, 31-40.
- Bukvareva, E. (2018) The optimal biodiversity—a new dimension of landscape assessment. *Ecological Indicators*, 94, 6-11.
- Bunce, R.G.H. et al. (2006) A review of the Role of drove roads (Cañadas) as ecological corridors. *Alterra-rapport*, 1428.
- Burton, J.R.F., & Parahagawewa, U.H. (2011) Creating culturally sustainable agri-environmental schemes. *Journal of Rural Studies*, 27:95-104.

- CAP4Nature (2019) An ecological evidence base to inform the future of the Common Agricultural Policy in Ireland <https://www.cap4nature.com/>
- Carmona, C. P., Azcárate, F. M., Oteros-Rozas, E., González, J. A., & Peco, B. (2013). Assessing the effects of seasonal grazing on holm oak regeneration: implications for the conservation of Mediterranean dehesas. *Biological Conservation*, 159, 240-247..
- Chapron, G. et al. (2014) Recovery of large carnivores in Europe's modern human-dominated landscapes. *Science*, 346: 1517-1519.
- Clark, S. (2020). Organic Farming and Climate Change: The Need for Innovation. *Sustainability*, 12, 7012.
- Clough, Y., Kirchweiger, S., & Kantelhardt, J. (2020) Field sizes and the future of farmland biodiversity in European landscapes. *Conservation Letters*, e12752.
- Cole L.J. et al. (2020) A critical analysis of the potential for EU Common Agricultural Policy measures to support wild pollinators on farmland. <https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/1365-2664.13572>
- Cole, L.J., Kleijn, D., Dicks, L.V., Stout, J.C., Potts, S.G., Albrecht, M., Balzan, M.V., Bartomeus, I., Bebeli, P.J., Bevk, D., & Biesmeijer, J.C. (2020) A critical analysis of the potential for EU Common Agricultural Policy measures to support wild pollinators on farmland. *Journal of Applied Ecology*, 57: 681-694.
- Cole, L.J., Stockan, J., & Helliwell, R. (2020) Managing riparian buffer strips to optimise ecosystem services: A review. *Agriculture, Ecosystems & Environment*, 106891.
- Concepción, E., Aneva, I., Jay, M., Lukanov, S., Marsden, K., Moreno, G., Oppermann, R., Pardo, A., Piskol, S., Rolo, V., Schraml, A., & Díaz, M. (2020) Optimizing biodiversity gain of European agriculture through regional targeting and adaptive management of conservation tools. *Biological Conservation* 241 <https://doi.org/10.1016/j.biocon.2019.108384>
- Concepción, E.D., & Díaz, M. 2019. Varying potential of CAP conservation tools for the preservation of farmland birds. *Science and the Total Environment* 694: 133618. DOI: 10.1016/j.scitotenv.2019.133618
- Concepción, E.D., Díaz, M., & Baquero, R.A. (2008) Effects of landscape complexity on the ecological effectiveness of agri-environment schemes. *Landsc. Ecol.* 23, 135–148. <https://doi.org/10.1007/s10980-007-9150-2>.
- Concepción, E.D., Díaz, M., Kleijn, D., Báldi, A., Batáry, P., Clough, Y., Gabriel, D., Herzog, F., Holzschuh, A., Knop, E., Marshall, E.J.P., Tscharnkte, T., & Verhulst, J. (2012) Interactive effects of landscape context constrain the effectiveness of local agrienvironmental management. *J. Appl. Ecol.* 49, 695–705. <https://doi.org/10.1111/j.1365-2664.2012.02131.x>
- conservation/species/carnivores/pdf/190211LETTER%20VELLA-HOGAN%20to%20ENV-AGRI%20Ministers.pdf
- Corkery, I., Irwin, S., Quinn, J.L., Keating, U., Lusby, J., & O'Halloran, J. (2020) Changes in forest cover result in a shift in bird community composition. *J Zool*, 310: 306-314. <https://doi.org/10.1111/jzo.12757>
- Da Ponte, E., Costafreda-Aumedes, S., & Vega-Garcia, C. (2019). Lessons learned from arson wildfire incidence in reforestations and natural stands in Spain. *Forests*, 10, 229.

- de Saint Marie, C. (2013) Rethinking agri-environmental schemes. A result-oriented approach to the management of species-rich grasslands in France. *Journal of Environmental Planning and Management*, 57:704-719.
- Delaney, A., & Stout, J.C. (2018) Principles of cross congruence do not apply in naturally disturbed dune slack habitats: Implications for conservation monitoring. *Ecological Indicators*, 93:358-364.
- Díaz, M., & Concepción, E.D. (2016) Enhancing the Effectiveness of CAP Greening as a Conservation Tool: a Plea for Regional Targeting Considering Landscape Constraints. *Curr Landscape Ecol Rep* 1:168–177.
- EPA (2020) Ireland's Environment – An Integrated Assessment. Environment Protection Agency, Wexford, 456pp ISBN: 978-1-84095-953-6
- Ernault, A., Vialatte, A., Butet, A., Michel, N., Rantier, Y., Jambon, O., & Burel, F. (2013) Grassy strips in their landscape context, their role a Gascuel-Odoux, C., Massa, F., Durand, P., Merot, P., Troccaz, O., Baudry, J., & Thenail, C. (2009) Framework and tools for agricultural landscape assessment relating to water quality protection. *Environmental management*, 43(5), 921-935.
- European Court of Auditors (2011) Is agri-environment support well designed and managed?
- European Court of Auditors (2019) OPINION No 7/2018 (pursuant to Article 322(1)(a) TFEU) concerning Commission proposals for regulations relating to the common agricultural policy for the post-2020 period (COM(2018) 392, 393 and 394 final).
- Fahrig, L. (2020). Why do several small patches hold more species than few large patches?. *Global Ecology and Biogeography*, 29, 615-628.
- FFNTG (2020) Draft Proposals for the CAP Green Architecture and Implementation in Ireland-A working paper of the Farming for Nature Technical Group. Unpublished report April 2020.
- Finn, J.A., & Ó'hUallacháin, D. (2012) A review of evidence on the environmental impact of Ireland's rural environment protection scheme (REPS). *Biology and Environment: Proceedings of the Royal Irish Academy*, 11-34.
- Finn, J.A., Ó'hUallacháin, D., & Sheridan, H. (2020) Grassland conservation options in AEOS from a results-based perspective. *Farmland Ecology*, blog post. <https://farmecol.blogspot.com/2020/11/grassland-conservation-options-in-aeos.html>
- Fischer, R.A., & Fischenich, J.C. (2000) Design recommendations for riparian corridors and vegetated buffer strips. Army engineer waterways experiment station vicksburg ms engineer research and development center.
- García, D., & Martínez, D. (2012) Species richness matters for the quality of ecosystem services: a test using seed dispersal by frugivorous birds. *Proceedings of the Royal Society B* 279: 3106-3013.
- García, D., Miñarro, M., & Martínez-Sastre, R. (2018) Birds as suppliers of pest control in cider apple orchards: avian biodiversity drivers and insectivory effect. *Agriculture, Ecosystems and Environment* 254:233-243.
- García, D., Zamora, R., & Amico, G.C. (2010) Birds as suppliers of seed dispersal in temperate ecosystems: conservation guidelines from real-world landscapes. *Conservation Biology* 24: 1070-1079.

- García-Feced, C., Weissteiner, C.J., Baraldi, A., Paracchini, M.L., Maes, J., Zulian, G., Kempen, M., Elbersen, B. & Pérez-Soba, M. (2015) Semi-natural vegetation in agricultural land: European map and links to ecosystem service supply. *Agronomy for Sustainable Development*, 35, 273-283.
- García-Fernández, A. et al. (2019) Herbivore corridors sustain genetic footprint in plant populations: a case for Spanish drove roads. *PeerJ* 7, e7311.
- García-Llamas, P., Geijzendorffer, I.R., García-Nieto, A.P., Calvo, L., Suárez-Seoane, S., & Cramer, W. (2019) Impact of land cover change on ecosystem service supply in mountain systems: a case study in the Cantabrian Mountains (NW of Spain). *Regional Environmental Change*, 19(2), 529-542.
- Gouriveau, F., Beaufoy, G., Moran, J., Poux, X., Herzon, I., Ferraz de Oliveira, M.I., Gaki, D., Gaspart, M., Genevet, E., Goussios, D., Herrera, P.M., Jitea, M., Johansson, L., Jones, G., Kazakova, Y., Lyszcza, D., McCann, K., Priac, A., Puig de Morales, M., Rodriguez, T., Roglić, M., Stefanova, V., & Zinsstag G. (2019) What EU policy framework do we need to sustain High Nature Value (HNV) farming and biodiversity? Policy Paper prepared in the framework of HNV-Link (project funded by the H2020 Research and Innovation Programme under Grant Agreement no 696391).
- Groffman, P.M., Axelrod, E.A., Lemunyon, J.L., & Sullivan, W.M. (1991) Denitrification in grass and forest vegetated filter strips. *Journal of environmental Quality*, 20(3), 671-674.
- Gushev, C., Tzonev, R., & Dimitrov, M. (2016) The future of submeasure “Pastoralism” of Measure 214 “Agro-ecological payments” in the Rural Development Programme of Bulgaria: advantages, disadvantages and challenges. *PHYTOLOGIA BALCANICA* 22(2): 167–177 http://www.bio.bas.bg/~phytolbalcan/PDF/22_2/PhytolBalcan_22-2_06_Gushev_&_al.pdf
- Happe, A.K., Alins, G., Boreux, V., Bosch, J., García, D., Hambäck, P., Klein, A.M., Martínez-Sastre, R., Miñarro, M., Müller, A.K., Porcel, M., Rodrigo, A., Roquer-Bení, L., Samnegar, U., Tasin, M., & Mody, K. (2019) Predatory arthropods in apple orchards across Europe: responses to agricultural management, adjacent habitat, landscape composition and country (2019) *Agriculture, Ecosystems and Environment* 273:141-150.
- Hejnowicz, A.P., Rudd, M.A., & White, P.C.L. (2016) A survey exploring private farm advisor perspectives of agri-environment schemes: The case of England’s Environmental Stewardship programme. *Land Use Policy*, 55:240-256.
- Herrera, J.M., & García, D. (2009) Role of remnant trees in seed dispersal through the matrix: being alone is not always so sad. *Biological Conservation* 143: 149-158.
- Herzon, I. et al. (2018) Time to look for evidence: Results-based approach to biodiversity conservation on farmland in Europe. *Land Use Policy*, 71:347-354.
- Hevia, V. et al. (2013) Exploring the role of transhumance drove roads on the conservation of ant diversity in Mediterranean agroecosystems. *Biodiversity and Conservation*, 22:2567-2581.
- Hevia, V. et al. (2016) Bee diversity and abundance in a livestock drove road and its impact on pollination and seed set in adjacent sunflower fields. *Agriculture, Ecosystems and the Environment*, 232:336-344.
- Hille, S., Andersen, D. K., Kronvang, B., & Baattrup-Pedersen, A. (2018) Structural and functional characteristics of buffer strip vegetation in an agricultural landscape—high potential for nutrient removal but low potential for plant biodiversity. *Science of the Total Environment*, 628, 805-814.
- Hristov, I., & N. Petkov (2013) State of Common Birds in Bulgaria 2005-2013. Bulgarian Society for the Protection of Birds. Conservation series. Book 27. BSPB. Sofia.

- Jackson, S.F., Walker, K., & Gaston, K.J. (2009) Relationship between distributions of threatened plants and protected areas in Britain. *Biological Conservation*, 142:1515-1522.
- Kazakova-Mateva, J. (2020) Policies to support the use of agricultural land in the European ecological network "Natura 2000", Publishing complex – UNWE, 2020, 155pp. ISBN 978-619-232-341-7. (In Bulgarian only)
- Kazakova-Mateva, Y. (2020) Regional uptake of environmentally focused rural development measures in Bulgaria. *Bulg. J. Agric. Sci.*, 2020. 26 (1), 43–52. ISSN 1310-0351 https://journal.agrojournal.org/page/en/details.php?article_id=2694
- Kleijn, D. et al. (2006) Mixed biodiversity benefits of agri-environment schemes in five European countries. *Ecology Letters*, 9:243-254.
- Kleijn, D., Kohler, F., Báldi, A., Batáry, P., Concepción, E.D., Clough, Y. et al. (2008) On the relationship between farmland biodiversity and land-use intensity in Europe. *Proceedings of the Royal Society B: biological sciences*, 276(1658), 903-909.
- Koester, U., & Loy, J.P. (2016) EU Agricultural Policy Reform- Evaluating the EU's New Methodology for Direct Payments. *Intereconomics*, 51: 278-285.
- Larkin, J., Sheridan, H., Finn, J. A., Denniston, H., & Ó'hUallacháin, D. (2019) Semi-natural habitats and Ecological Focus Areas on cereal, beef and dairy farms in Ireland. *Land Use Policy*, 88, <https://doi.org/10.1016/j.landusepol.2019.104096>
- Lastra-Bravo, X.B. et al. (2015) What drives farmers' participation in EU agri-environmental schemes?: Results from a qualitative meta-analysis. *Environ. Sci. Policy* 54:1-9.
- Lewis, L.J., Coombes, D., Burke, B., O'Halloran, J., Walsh, A., Tierney, T. D., & Cummins, S. (2019) Countryside Bird Survey: Status and trends of common and widespread breeding birds 1998-2016. *Irish Wildlife Manuals*, No. 115. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.
- Litskas, V., Mandoulaki, A., Vogiatzakis, I. N., Tzortzakis, N., & Stavrínides, M. (2020). Sustainable Viticulture: First Determination of the Environmental Footprint of Grapes. *Sustainability*, 12(21), 8812. <https://doi.org/10.3390/su12218812>
- Maestre, F. T., & Cortina, J. (2004). Are *Pinus halepensis* plantations useful as a restoration tool in semiarid Mediterranean areas?. *Forest Ecology and Management*, 198, 303-317.
- Magda, D. et al. (2015) Integrating Agricultural and Ecological Goals into the Management of Species-Rich Grasslands: Learning from the Flowering Meadows Competition in France. *Environmental Management*, 56:1053-1064.
- Manenti, R. (2014) Dry stone walls favour biodiversity: a case-study from the Appennines. *Biodiversity and conservation*, 23(8), 1879-1893.
- Manzano Baena, P., & Casas, R. (2010) Pastoralism: Research, Policy and Practice 1, 72-90; Hevia et al 2013, *Biodiv & Cons.* 2013: 2567-2581; Carmona et al 2013, *Biol. Cons.* 159: 240-247.
- Martínez, D., & García, D. (2015) Changes in fruiting landscapes relax restrictions on zoochorous tree dispersal into deforested lands. *Applied Vegetation Science* 18:197-208.

- Martínez, D., & García, D. (2017) Role of avian seed dispersers in tree recruitment in woodland pastures. *Ecosystems* 20:616-629.
- Martínez-Sastre, R., García, D., Miñarro, M., & Martín-López, B. (2020) Farmers' perceptions and knowledge of natural enemies as providers of biological control in cider apple orchards. *Journal of Environmental Management* 266:110589.
- Martínez-Sastre, R., Miñarro, M., & García, D. (2020) Animal biodiversity in cider apple orchards: simultaneous environmental drivers and effects on insectivory and pollination. *Agriculture, Ecosystems and Environment* 295:106918.
- Matin, S., Sullivan, C.A., Finn, J.A., Green, S., Meredith, D., & Moran, J. (2020) Assessing the distribution and extent of High Nature Value farmland in the Republic of Ireland. *Ecological Indicators*, 108, p.105700.
- Matin, S., Sullivan, C.A., Ó hUallacháin, D., Meredith, D., Moran, J., Finn, J.A., & Green, S. (2016) Predicted distribution of High Nature Value farmland in the Republic of Ireland. *Journal of Maps*, 12(sup1), pp.373-376.
- Merot, P., Aurousseau, P., Gascuel-Oudou, C., & Durand, P. (2009) Innovative assessment tools to improve water quality and watershed management in farming areas. *Integrated environmental assessment and management*, 5(1), 158-166.
- Miñarro, M., & García, D. (2016) Manzana, kiwi y arándano: sin insectos no hay frutos ni beneficios. *Tecnología Agroalimentaria-SERIDA* 18:4-8.
- Miñarro, M., & García, D. (2018) Complementarity and redundancy in the functional niche of cider apple pollinators. *Apidologie* 49:789-802.
- Miñarro, M., & García, D. (2018) Unravelling pest infestation and biological control in low-input orchards: the case of apple blossom weevil. *Journal of Pest Science* 91:1047-1061.
- Miñarro, M., & García, D. (2020) Decálogo para una pumarada sostenible. *Tecnología Agroalimentaria-SERIDA* 23:2-5.
- Miñarro, M., & Prida, E. (2013) Hedgerows surrounding organic apple orchards in north-west Spain: potential to conserve beneficial insects. *Agricultural and Forest Entomology* 15: 382-390.
- Moran, J., & Sullivan, C. (2017) Co-benefits for Water and Biodiversity from the Sustainable Management of High Nature Value Farmland. Report No. 209, Wexford. https://www.epa.ie/pubs/reports/research/biodiversity/EPA%20RR%20209_webEssentra.pdf
- Morán-Ordóñez, A., Bugter, R., Suárez-Seoane, S., de Luis, E., & Calvo, L. (2013) Temporal changes in socio-ecological systems and their impact on ecosystem services at different governance scales: a case study of heathlands. *Ecosystems*, 16(5), 765-782.
- Murano, C., Kasahara, S., Kudo, S., Inada, A., Sato, S., Watanabe, K., & Azuma, N. (2019) Effectiveness of vole control by owls in apple orchards. *Journal of Applied Ecology*, 56(3), 677-687.
- Navarro, A., & López-Bao, J.V. (2018) Towards a greener Common Agricultural Policy. *Nature Ecology and Evolution*, 2:1830-1833.
- Navarro, A., & López-Bao, J.V. (2019) EU agricultural policy still not green. *Nature Sustainability*, 2:990.

- Nikolov, S.C. (2010) Effects of land abandonment and changing habitat structure on avian assemblages in upland pastures of Bulgaria. *Bird conservation international*, 20(2), 200-213.
- Nikolov, S.C., Demerdzhiev, D.A., Popgeorgiev, G.S., & Plachiyski, D.G. (2011) Bird community patterns in sub-Mediterranean pastures: the effects of shrub cover and grazing intensity. *Animal Biodiversity and Conservation*, 34(1), 11-21.
- Nilsson, L., Clough, Y., Smith H.G., Olsson, J. A., Brady, M. V., Hristov, J., Olsson, P., Skantze, K., Ståhlberge, D., Dänhardt, J. (2019) A suboptimal array of options erodes the value of CAP ecological focus areas, *Land Use Policy*, 2019: 85, 407-408.
- NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol1_Summary_Article17.pdf
- Ó'hUallacháin, D. et al. (2016) A comparison of grassland vegetation from three agri-environment conservation measures. *Irish Journal of Agricultural and Food Research*, 2016: 55, 176-191.
- O'Rourke, E., & Kramm, N. (2009) Changes in the Management of the Irish Uplands: A Case-Study from the Iveragh Peninsula, *European Countryside*, 1(1), 53-66. doi: <https://doi.org/10.2478/v10091-009-0005-5>.
- Oteros-Rozas, E. et al. (2013) Socio-cultural valuation of ecosystem services in a transhumance social-ecological network. *Regional Environmental Change*, 14:1269-1289.
- Pardo, A., Rolo, V., Concepción, E. D., Díaz, M., Kazakova, Y., Stefanova, V., Marsden, K., Brandt, K., Jay, M., Piskol, S., Oppermann, R., Schraml, A., & G. Moreno (2020) To what extent does the European common agricultural policy affect key landscape determinants of biodiversity?. *Environmental Science & Policy*, 114, 595-605 <https://doi.org/10.1016/j.envsci.2020.09.023>
- Pavlis, E.S. et al. (2015) Patterns of agri-environmental scheme participation in Europe: Indicative trends from selected case studies. *Land Use Policy*, 57:800-812.
- Paz, A., Jareño, D., Arroyo, L., Viñuela, J., Arroyo, B., Mougeot, F. et al. (2013) Avian predators as a biological control system of common vole (*Microtus arvalis*) populations in north-western Spain: experimental set-up and preliminary results. *Pest Management Science*, 69(3), 444-450.
- Pe'er, G. et al. (2017) Is the CAP fit for purpose? An evidence-based fitness check assessment (German Centre for Integrative Biodiversity Research).
- Peneva, M., Kazakova-Mateva, J. (2019) Spatial analysis of environmentally friendly agriculture in Bulgaria, Publishing complex – UNWE, 2019, 185pp. ISBN 978-619-232-180-2. (In Bulgarian only)
- Peneva, M., Kazakova-Mateva, J., Lukanov, S., Aneva, I., Stefanova, B., Topchieva, M. (2020) Biodiversity, green and blue infrastructure and agriculture in Bulgaria. Publishing complex – UNWE, 2020. ISBN 978-619-232-289-2. (In Bulgarian only)
- Pinto-Correia, T., & Azeda, C. (2017). Public policies creating tensions in Montado management models: Insights from farmers' representations. *Land Use Policy*, 64, 76-82.
- Primdahl, J., Vesterager, J.P., Finn, J.A., Vlahos, G. Kristensen, L., & Vejre, H. (2010) Current use of impact models for agri-environment schemes and potential for improvements of policy design and assessment. *Journal of Environmental Management* 91: 1245-1254.

- Prince, H.E., Bunce, R.G., & Jongman, R.H. (2012) Changes in the vegetation composition of hay meadows between 1993 and 2009 in the Picos de Europa and implications for nature conservation. *Journal for Nature Conservation*, 20(3), 162-169.
- Rosa-García, R., & Miñarro, M. (2014) Role of floral resources in the conservation of pollinators in cider apple orchards. *Agriculture, Ecosystems and Environment* 183: 118-126.
- Roschewitz, I., Gabriel, D., Tschardt, T., & Thies, C. (2005). The effects of landscape complexity on arable weed species diversity in organic and conventional farming. *Journal of Applied Ecology*, 42, 873-882.
- Rotchés-Ribalta, R., Ruas, S., Ahmed, K.D., Gormally, M., Moran, J., Stout, J., White, B., & Ó hUallacháin, D. (2020) Assessment of semi-natural habitats and landscape features on Irish farmland: New insights to inform EU Common Agricultural Policy implementation. *Ambio*. 2020 May 29. <https://doi.org/10.1007/s13280-020-01344-6>.
- Russi, D. et al. (2016) Result-based agri-environment measures: Market-based instruments, incentives or rewards? The case of Baden-Württemberg. *Land Use Policy*, 54: 69-77.
- Scheper et al. (2013), Environmental factors driving the effectiveness of European agri-environmental measures in mitigating pollinator loss – a meta-analysis, *Ecology Letters*.
- Schermer, M. et al. (2016) Institutional impacts on the resilience of mountain grasslands: an analysis based on three European case studies. *Land Use Policy* 52, 382-391.
- Scown et al., 2019 Aligning research with policy and practice for sustainable agricultural land systems in Europe, *PNAS* 116 (11) 4911-4916.
- Scown, M. Brady, M. Nicholas, K. (2020) Billions in Misspent EU Agricultural Subsidies Could Support the Sustainable Development Goals, *One Earth*, Vol 3, Issue 2, P237-250.
- Scown, M. & Nicholas, K. (2020) European agricultural policy requires a stronger performance framework to achieve the Sustainable Development Goals, *Global Sustainability*.
- Serra, A.A., Bittebière, A.K., Mony, C., Slimani, K., Pallois, F., Renault, D. et al. (2020) Local-scale dynamics of plant-pesticide interactions in a northern Brittany agricultural landscape. *Science of the Total Environment*, 744, 140772.
- Sheridan, H., Keogh, B., Anderson, A., Carnus, T., McMahon, B.J., Green, S., & Purvis, G. (2017) 'Farmland habitat diversity in Ireland', *Land Use Policy*, 63, 206-213, available: <http://dx.doi.org/https://doi.org/10.1016/j.landusepol.2017.01.031>
- Sheridan, H., McMahon, B.J., Carnus, T., Finn, J.A., Anderson, A., Helden, A.J., Kinsella, A., & Purvis, G. (2011) Pastoral farmland habitat diversity in south-east Ireland. *Agriculture, Ecosystems & Environment*, 144(1), pp.130-135.
- Sokos, C.K. et al. (2013) Farming and wildlife in Mediterranean agroecosystems. *J. Nat. Conserv.*, 21: 81-92.
- Stutter, M. I., Chardon, W. J., & Kronvang, B. (2012) Riparian buffer strips as a multifunctional management tool in agricultural landscapes: introduction. *Journal of Environmental Quality*, 41(2), 297-303.
- Suárez-Seoane, S., Osborne, P. E., & Baudry, J. (2002) Responses of birds of different biogeographic origins and habitat requirements to agricultural land abandonment in northern Spain. *Biological Conservation*, 105(3), 333-344.

- Sullivan, C.A., Bourke, D., Skeffington, M.S., Finn, J.A., Green, S., Kelly, S., & Gormally, M.J. (2011) Modelling semi-natural habitat area on lowland farms in western Ireland. *Biological Conservation*, 144(3), pp.1089-1099.
- Šumrada, T., Kmecl, P., & Erjavec, E. (2021) Do the EU's Common agricultural policy funds negatively affect the diversity of farmland birds? Evidence from Slovenia. *Agriculture, Ecosystems and Environment*, 306(2021), 107200.
- Tamburini, G., Bommarco, R., Wanger, T. C., Kremen, C., van der Heijden, M. G., Liebman, M., & Hallin, S. (2020). Agricultural diversification promotes multiple ecosystem services without compromising yield. *Science advances*, 6, eaba1715.
- Tarjuelo, R., Margalida, A., & Mougeot, F. (2020). Changing the fallow paradigm: A win-win strategy for the post-2020 Common Agricultural Policy to halt farmland bird declines. *Journal of Applied Ecology*, 57, 642-649.
- Teillard, F., de Souza, D.M., Thoma, G., Gerber, P.J., & Finn, J.A. (2016) What does Life-Cycle Assessment of agricultural products need for more meaningful inclusion of biodiversity? *Journal of Applied Ecology*, 53: 1422-1429.
- Traba, J., & Morales M. (2019) The decline of farmland birds in Spain is strongly associated to the loss of fallowland. *Sci Rep* 9, 9473. <https://doi.org/10.1038/s41598-019-45854-0>
- Tscharntke, T., Klein, A.M., Kruess, A., Steffan-Dewenter, I., & Thies, C. (2005) Landscape perspectives on agricultural intensification and biodiversity – “ecosystem service management”. *Ecol. Lett.* 8, 857–874. <https://doi.org/10.1111/j.1461-0248.2005.00782.x>
- Tscharntke, T., Tylianakis, J.M., Rand, T.A., Didham, R.K., Fahrig, L., Batáry, P., Bengtsson, J., Clough, Y., Crist, T.O., Dormann, C.F., Ewers, R.M., Fründ, J., Holt, R.D., Holzschuh, A., Klein, A.M., Kleijn, D., Kremen, C., Landis, D.a., Lurance, W., Lindenmayer, D., Scherber, C., Sodhi, N., Steffan-Dewenter, I., Thies, C., van der Putten, W.H., & Westphal, C. (2012) Landscape moderation of biodiversity patterns and processes – eight hypotheses. *Biol. Rev.* 87, 661–685. <https://doi.org/10.1111/j.1469-185X.2011.00216.x>.
- Tsonjev, R. & Gusev, C. (2017) Guide to the identification and effective management of grassland habitats. Pastures, meadows and permanent grasslands - subject to protection and economic use in Bulgaria. BSPB. Protective series - Book 34, Sofia. (In Bulgarian only)
- Vella, K., & Hogan, P. (2019) Letter to: EU Ministers of Environment and Agriculture. Ref. Ares(2019)935037. Brussels, 11/02/2019. <https://ec.europa.eu/environment/nature/>
- Vought, L.B.M., Pinay, G., Fuglsang, A., & Ruffinoni, C. (1995) Structure and function of buffer strips from a water quality perspective in agricultural landscapes. *Landscape and urban planning*, 31(1-3), 323-331.
- Waesche, G., & Becker, T. (2009) Plant diversity differs between young and old mesic meadows in a central European low mountain region. *Agriculture, ecosystems & environment*, 129(4), pp.457-464.
- Walsh et al. (2015) The distribution of vascular plant species of conservation concern in Ireland, and their coincidence with designated areas. *Journal for Nature Conservation*, 24: 56-62.

- Wieck, C., & Hausmann, I. (2019) Indicators everywhere: The new accountability of agricultural policy? 172nd EAAE Seminar, May 28-29, 2019, Brussels, Belgium 289722, European Association of Agricultural Economists.
- Zomeni, M., Martinou, A., Stavrinides, M., & Vogiatzakis, I. (2018). High nature value farmlands: challenges in identification and interpretation using Cyprus as a case study. *Nature Conservation*, 31, 53–70. <https://doi.org/10.3897/natureconservation.31.28397>

Bibliografische Information:
Die Deutsche Nationalbibliothek
verzeichnet diese Publikationen
in der Deutschen National-
bibliografie; detaillierte
bibliografische Daten sind im
Internet unter
www.dnb.de abrufbar.

Bibliographic information:
The Deutsche Nationalbibliothek
(German National Library) lists
this publication in the German
National Bibliographie; detailed
bibliographic data is available on
the Internet at www.dnb.de

Bereits in dieser Reihe erschie-
nene Bände finden Sie im Inter-
net unter www.thuenen.de

Volumes already published in
this series are available on the
Internet at www.thuenen.de

Zitationsvorschlag – Suggested source citation:

Pe'er G, Birkenstock M, Lakner S, Röder N (2021) The Common Ag-
ricultural Policy post-2020: Views and recommendations from scien-
tists to improve performance for biodiversity : Volume 2 – Annexes.
Braunschweig: Johann Heinrich von Thünen-Institut, 264 p, Thünen
Working Paper 175, Vol. 2, DOI:10.3220/WP1620647428000

Die Verantwortung für die
Inhalte liegt bei den jeweiligen
Verfassern bzw. Verfasserinnen.

The respective authors are
responsible for the content of
their publications.



Thünen Working Paper 175 – Volume 2

Herausgeber/Redaktionsanschrift – *Editor/address*

Johann Heinrich von Thünen-Institut
Bundesallee 50
38116 Braunschweig
Germany

thuenen-working-paper@thuenen.de
www.thuenen.de

ISBN: 978-3-86576-225-2
DOI:10.3220/WP1620647428000
urn:nbn:de:gbv:253-202105-dn063618-4

ISBN 978-3-86576-225-2



9 783865 762252