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Thematic Group on Landscape Features and Biodiversity

Background document

Overview of landscape features and biodiversity

1. Introduction

Farmers have a major role to play in improving the conservation and restoration of wildlife habitats and species that depend on the landscape features present on farmland across Europe. If the EU is to achieve the targets of the Biodiversity Strategy 2030 and meet the requirements of the proposed Nature Restoration Regulation, the CAP will be an important source of funding at farm level. The Thematic Group on Landscape Features and Biodiversity provides an opportunity to bring Member State representatives and stakeholders together to discuss how to improve the management, restoration and creation of landscape features on EU farmland. A key issue will be the coherent design and implementation of interventions under both Pillars of the CAP, including eligibility rules, conditionality, eco-schemes, environmental land management contracts and investment support to enhance both the extent and condition of landscape features in the farmed environment.

The proposed objectives of the Group are to:

- explore how landscape features may be protected, maintained, created and restored using a range of CAP interventions within different Member States;
- identify ways in which farmers may be encouraged to see landscape features as adding value to their operations and overcome barriers / challenges to uptake; and
- share experiences as to how Member States have supported landscape features' retention and creation in the past and how better data and targeted support may lessen habitat fragmentation and increase biodiversity.

This short background paper provides an introduction to the topic, drawing on recent research, EU policy initiatives and responses to CAP incentives to maintain, enhance and create landscape features.

2. What do we mean by 'landscape features'?

There is no single agreed definition of landscape features on farmland. JRC recently suggested the following; '*Agricultural landscape features (or henceforward simply landscape features, LF) are small fragments of non-productive natural or semi-natural vegetation in agricultural landscape* [sic] *which provide ecosystem services and support for biodiversity'* (Czúcz et al., 2022b, p. 4). They also proposed a functional classification of the different types, with examples commonly used in EU policy documents (**Error! Reference source not found.**).

Figure 1: Examples of landscape features. Source: Czúcz et al. (2022b)

Functional LF (FLF) class	Examples for commonly recognized subtypes
Woody features	Isolated trees, tree lines and avenues, hedges, woody strips, trees in group, field coppices and riparian woody vegetation
Grassy features	Grassy strips, field margins, embankments, buffer strips, grassed '*thalweg*'
Wet features	Inland channels of fresh water, standing small water bodies such as natural or man-made ponds, ditches.
Stony features	Dry stone walls, terrace elements, rock outcrops, natural or artificial stacks of stone.

Table 1: JRC proposed Functional Landscape Feature classification. Source: Czúcz et al. (2022b)

3. Why are landscape features so important for biodiversity?

From a biodiversity point of view, landscape features are structurally more complex, likely to be more stable over time than cropped areas and, depending on how they are managed, may be subject to less disturbance and relatively free of fertilisers and pesticides. This means they may have more diverse vegetation that is left uncut and undisturbed for much of the year, such as permanent grass field margins, buffer strips, scrub, dense hedges, and deadwood. These habitats can be sources of food, resting places and shelter (from predators, weather and in-field farming operations) as well as sites for breeding, rearing and over-wintering for a range

of animals, from soil organisms and invertebrates to small mammals and birds. An evaluation of the greening measures in the 2014-20 CAP (European Commission, 2017) summarised evidence for the biodiversity benefits of landscape features (except field margins), shown in

Box 1.

Box 1: Biodiversity benefits of selected landscape features

Hedgerows and wooded strips: hedgerows and other woody field boundaries benefit wildlife by providing habitats, feeding sites, refuges, and movement corridors for invertebrates, birds, mammals, reptiles and amphibians, and also support some wild species that would not otherwise exist in arable landscapes. However, individual hedges vary greatly in their character and management and hence their biodiversity value.

Trees, tree lines and tree groups or copses: isolated mature trees can provide more resources for tree-hole nesting birds and bats compared to treeless arable fields, while groups of trees provide refuges and key foraging habitats for generalist invertebrates, plants and common farmland birds in arable areas, and can also provide corridors between habitats for mammals.

Ponds and ditches can be hotspots of high biodiversity value, e.g. for freshwater invertebrates and amphibians, but biodiversity benefits may be low if levels of nutrient pollution are high and riparian vegetation is lacking. There is evidence that large numbers of farmland ponds have been lost particularly in Western Europe in recent decades.

Stone-walled terraces, which are typical of Mediterranean regions, provide disturbance-free habitats with specific micro-climates for plants, reptiles, amphibians, invertebrates, etc. typical of dry and stony habitats. Earth bank terraces can provide strips of exposed habitats suitable for some threatened arable plants and invertebrates, such as solitary bees, if the soil is of low fertility with bare patches.

There is also a large body of evidence on the biodiversity benefits of fallow land, referring mainly to land that is left fallow for a year or several years (Box 2).

Box 2: Effect of fallow on biodiversity

A meta-analysis of the impacts of fallow on biodiversity, based on 127 monitoring studies from Europe and North America, concluded that land withdrawn from conventional production unequivocally enhances biodiversity of birds, insects, spiders, harvestmen and plants in Europe (Van Buskirk and Willi, 2004). The study found that benefits are greatest on large parcels of land and on areas that have been left fallow for longer for all taxa except 'bird species richness', which declined significantly with the increasing age of the fallow. Studies in Sweden (Wretenberg et al 2007), Finland (Herzon, et al, 2011) and Hungary (Kovács-Hostyánszki, et al, 2011) have also found that population trends of common farmland bird species are significantly benefited by the presence of fallow land.

A review of the impacts of long-term fallow on biodiversity (Tscharntke, Batáry and Dormann, 2011) found that simple landscapes benefit most, where improvements have the highest relative effect and are influenced by sowing patterns and age of succession, whereas in complex landscapes, fallows cannot add much to an already high amount of biodiversity. Nevertheless, fallows in more complex or extensively managed landscapes can provide key resources for some species of conservation concern.

Finally, the biodiversity value of landscape features depends not just on their characteristics but on their spatial location (in relation to agricultural land and other features/habitats), their 'patch' size and their contribution to diversity of land cover at local scale (i.e. an area of contiguous farmland under different ownership or management units).

4. Links with the Biodiversity Strategy and the proposed Nature Restoration Law

The **EU Biodiversity Strategy 2030** identified an urgent need to bring back at least 10% of agricultural area under '*high-diversity landscape features'*, including (but not limited to) buffer strips, rotational or non-rotational fallow land, hedges, non-productive trees, terrace walls, and ponds. It noted that '*Member States will need to translate the 10% EU target to a lower geographical scale to ensure connectivity among habitats, especially through the CAP instruments and CAP Strategic Plans, in line with the Farm to Fork Strategy, and through the implementation of the Habitats Directive*'[1].

Two years later, in June 2022, the **proposed Nature Restoration Regulation (pNRR**) translated this ambition into one of its requirements for agricultural ecosystems, specifically that Member States shall achieve an increasing trend at national level of each of three indicators (grassland butterfly index; stock of organic carbon in cropland mineral soils; and share of agricultural land with high-diversity landscape features). These indicators will first be measured from the date of entry into force of the NRR (if adopted) until 31 December 2030, and then every three years thereafter. The pNRR defined a detailed indicator for high-diversity landscape features managed according to strict conditions, as detailed in Box 3**.**

Box 3: Proposed NRR indicator for share of agricultural land with high-diversity landscape features

Description: High-diversity landscape features are elements of permanent natural or semi-natural vegetation present in an agricultural context which provide ecosystem services and support for biodiversity. In order to do so, landscape features need to be subject to as little external disturbances as possible to provide safe habitats for various taxa, and therefore need to comply with the following conditions:

a) they cannot be under productive agricultural use (including grazing or fodder production), and
b) they should not receive fertilizer or pesticide treatment.

Land lying fallow can be considered a high diversity landscape feature if it complies with criteria (a) and (b) above. Productive trees that are part of arable land agroforestry systems and productive elements in non-productive hedges can also be considered to be high diversity landscape features, if they comply with criterion (b) above, and if harvests take place only at moments where it would not compromise high biodiversity levels.

Unit: Percent (share of Utilised Agricultural Area).

Methodology: as developed under indicator I.21, Annex I of Regulation 2021/2115, as based on LUCAS for landscape elements, Ballin M. et al. (2018) *Redesign sample for Land Use/Cover Area frame Survey (LUCAS)*, Eurostat, and for land laying fallow, *Farm Structure, Reference Metadata in Single Integrated Metadata Structure,* online publication, Eurostat.

Source: COM(2022) 304 final ANNEXES to the proposal for a Regulation of the European Parliament and of the Council on nature restoration: ANNEX IV

[1] COM(2020) 380 final

5. What are the co-benefits and trade-offs for the farm business?

One of the co-benefits of landscape features on farms is their contribution to pollination services. A recent study estimated that the absence of insect pollination would result in a reduction of between -25% and -32% total production of crops which are partially dependent on insect pollination in the EU. However, this reduction varies strongly between countries, the most vulnerable country being Slovenia, which would face an estimated reduction around -57% (Vallecillo et al., 2018). In Europe, pollinators are primarily insects – including bees, hoverflies, butterflies, moths, beetles, wasps, thrips, and other fly species. Honeybees are often assumed to provide the majority of pollination services to agriculture, but actually, most pollination is brought about by wild pollinators, and it is well established that the presence of wild bees improves crop performance even if honeybees are present. Most farms will have some pollinator habitats, but these may be of limited value if they do not provide enough suitable flowers in all seasons, as well as places for nesting and hibernation. Large areas of cereal cropping or intensively managed grassland or permanent crops with few field margins, hedges, rough grassland, or other unfarmed areas are likely to have the fewest pollinator resources and would benefit from the creation and restoration of landscape features managed for biodiversity.

Depending on the type and location of landscape features, there may be other environmental co-benefits such as reduced risk of soil erosion and floods, improved water infiltration and availability, biosecurity and microclimate adaptation, but it is difficult to quantify the economic benefits of these at farm level. There are of course costs to the farmer in protecting, maintaining, restoring and creating landscape features within an otherwise productive landscape, and therefore a risk that farmers may take a short-term view of the costs rather than a long-term view of the contribution of landscape features and the wildlife they support to the productive potential of the farm for future generations. Once lost, biodiversity-rich landscape features are hard to replace.

JRC has commented that *'In a sense, landscape features behave like economic 'commons', which provide public benefits threatened by self-interest (Hardin, 1968). In this context the main purpose of EU regulations is to prevent a new 'tragedy of the commons'. This is not an easy task, given the diversity of LF types combined with the diversity of historical, social, cultural and political contexts into which these LF types are embedded in the various Member States*' (Czúcz et al., 2022b).

6. Role of the CAP

CAP 2014-20 (extended to 2022)

Evaluation of the implementation of CAP greening requirements in the early part of the 2014-2020 programming period showed that, given the choice of several options for Ecological Focus Areas (EFA), the average uptake of the landscape features option was relatively low – 1.7% of the total EFA area in the EU28 in 2015, decreasing to 1.5% in 2016. The three main

landscape features declared as EFA that year were: hedges (62.2%) followed by field margins (20.6%) and ditches (6.7%)[2].

Error! Reference source not found.2 shows how Member States supported different types of landscape features using cross-compliance standards of Good Agricultural and Environmental Condition (GAEC) alongside EFA and RDP interventions between 2015 and 2021.

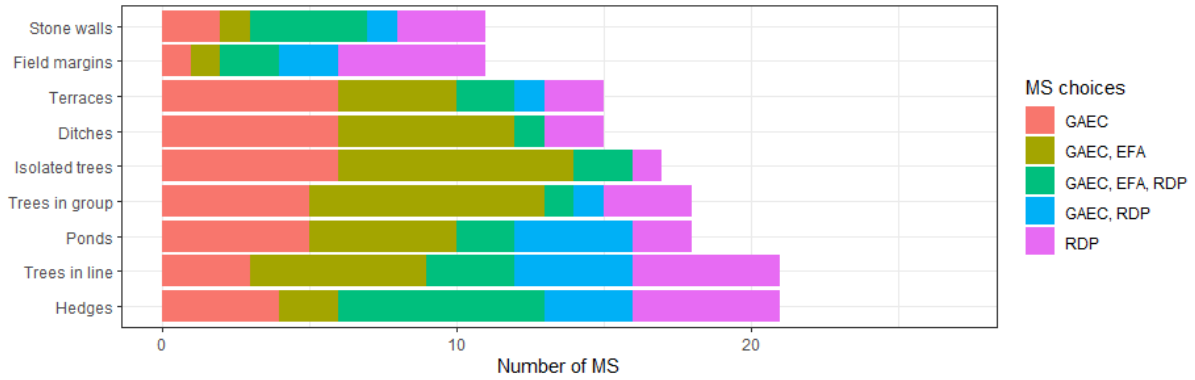

Figure 2: Member States supporting landscape features using different CAP measures 2015-21[3]
Source: Czúcz et al. (2022a) based on JRC GAEC database (GAEC & EFA); Prieto López et al. (2020) (RDP).

The new CAP: 2023-27

The green architecture of the new CAP reflects the need for a more coherent approach to supporting farmers to maintain, restore and create landscape features of biodiversity value. The conditionality requirements include a redefined GAEC 8, which has the same requirement to retain landscape features as the current CAP as well as a requirement to devote a minimum share of agricultural area to non-productive areas or features. This standard underpins a suite of interventions that can be used, separately or in combination, by individual farmers or groups of farmers – for example, ecoschemes fully funded under Pillar 1, complemented by co-financed rural development interventions under Pillar 2, including agri-environment-climate contracts, investments in restoration and creation of landscape features, cooperation and innovation, advice, training and knowledge transfer.

A significant feature of the new CAP is a clearer and more standardised approach to defining the eligibility of landscape features for income support payments through:

- an obligation for Member States to define 'eligible hectares' for decoupled direct payments to include landscape features protected under GAEC 8 and also GAEC 8 non-productive areas and features (including fallow) on the required share of arable land (or eco-schemes for the same purpose);
- offering Member States the option of making other landscape features eligible for direct payments, provided these do not cover more than a defined share of the land parcel.

[2] These are EU28 figures, EU27 would be lower because in 2015, in the UK, landscape features were 57% of the EFA area declared. Source: European Commission (2017)
[3] MS choices for EFAs which were not GAECs at the same time are missing from this figure.

The effect of this at farm level will of course depend on the scope of landscape features covered by the Member State's definition of GAEC 8 and the design of their eco-schemes. But it should provide farmers with more clarity and incentive to look after their landscape features. Early indications from the draft CAP Strategic Plans (CSPs) are that many Member States have included at least some landscape features in their eco-scheme options, on arable and other types of land, and some have complementary agri-environment-climate options too. In a number of cases, the opportunity has been taken to extend the definition of agricultural area eligible for direct payments to include landscape features.

The indicators for the biodiversity objectives of the new CAP include impact indicator I.21 '*share of agricultural land covered with landscape features*' and result indicator R34^{PR} '*share of utilised agricultural area (UAA) under supported commitments for managing landscape features, including hedgerows and trees*'. According to Eurostat definitions, UAA is a sub-set of agricultural land, so these indicators appear to have different denominators, although UAA is also the denominator for the much more detailed indicator of high diversity landscape features for the pNRR (see Box 3 for details).

7. Issues and potential questions for discussion

There are several issues and potential questions about how the new CAP and its successors, beyond 2030, can enable, encourage and support EU farmers to realise the full contribution that their existing and new landscape features could make to EU biodiversity and nature restoration targets, and to the long-term resilience and productive capacity of their farm businesses. This initial list (to be updated during the work of the TG) includes:

How to deploy most effectively the resources of the CSPs and the skills of farmers, biodiversity/agricultural advisers, researchers and other experts to:

- Encourage uptake now and continuation beyond 2030 of the management, restoration and creation of landscape features (in that order of priority) for biodiversity, in a way that both accrues biodiversity value over time and makes it possible to deliver the medium and long-term ambition of the Biodiversity Strategy and pNRR targets.

- Secure coordination and synergy between implementation of Member States' CSP priorities/measures for landscape features and the development/implementation of their Nature Restoration Plans, to achieve the respective indicators for landscape features.

- Offer farmers of different types (arable, grassland, permanent crops, extensive permanent grassland, small farms) the option to choose a coherent 'layer cake' of CAP interventions on landscape features designed for their system.

- Ensure that requirements for the creation and restoration of 'woody' landscape features for their carbon benefits also meet best practice standards for biodiversity management (e.g. using a mixture of native species, providing a no-input buffer zone between the woody feature and the crop).

- Protect and reward the high biodiversity value of long-established landscape features on small farms with diverse/low intensity management systems (e.g. those which qualify for the Art.28 small farmer payment).

Definitions and monitoring

- How to develop and refine the work started by JRC/EEA to reach a common definition of landscape features of EU farmland that:
    - encompasses the cultural distinctiveness and variation between different types of features (e.g. hedges, terraces, walls) across Europe?
    - recognises the *qualitative* structural, functional and spatial characteristics of landscape features that are associated with increasing biodiversity value (and longevity)?
    - can be used for targeting, monitoring and evaluation of CAP measures for landscape features, and for measuring the largely quantitative indicators of the Biodiversity Strategy and pNRR indicators?

- Given that verification for CAP payments and some EU-level data gathering relies increasingly on remote sensing rather than field visits, what, if any, is the role for results-based agri-environment payment contracts for landscape features managed for biodiversity?

Design and upscaling

- How can MS design measures to achieve 'landscape scale' biodiversity improvements in the quality, location, diversity and density of landscape features in areas where this is most needed?

- Do researchers, Managing Authorities and advisers have sufficient evidence and understanding of the economic, agronomic, biodiversity and climate adaptation impacts of landscape features on the resilience of different farming systems/businesses? If not, what more data are needed? How can individual farmers have access to this type of 'integrated advice'?

- Landscape features must be retained and managed for the long term if they are to benefit biodiversity, but in most cases they are a net cost to the business (and maybe also an opportunity cost in the case of more productive land). How might these barriers be overcome and turn LF into an economic opportunity?

8. References and further reading

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