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Guidance on a framework for developing methodologies to monitor high-diversity landscape features pursuant to Article 14(7) of the Nature Restoration Regulation (Regulation (EU) 2024/1991)

(C/2025/980)

This Commission Notice is intended to assist national authorities in the application of Regulation (EU) 2024/1991. Only the Court of Justice of the European Union is competent to authoritatively interpret Union law.

Contents

Page

1. Introduction, scope and legal framework 1

2. Monitoring of productive HDLFs 3

2.1. Productive trees in sustainable agroforestry systems 3

2.2. Trees in extensive old orchards on permanent grassland 7

2.3. Productive elements in hedges 8

3. Baseline value of the HDLF indicator 9

4. Area of reference 10

ANNEX I: European Monitoring of Biodiversity in Agricultural Landscapes (EMBAL) 11

ANNEX II: Agroforestry systems () 12

ANNEX III: IACS geospatial data from LPIS and GSA 20

1. INTRODUCTION, SCOPE AND LEGAL FRAMEWORK

The Nature Restoration Regulation) ([1]) (NRR) sets out targets and obligations for the restoration of ecosystems in the European Union. Article 11(2) of the NRR focuses on the restoration of agricultural ecosystems and requires Member States to put in place measures which aim to achieve an increasing trend at national level of at least two out of the following three indicators for agricultural ecosystems: (i) the grassland butterfly index; (ii) the stock of organic carbon in cropland mineral soils; and (iii) the share of agricultural land with high-diversity landscape features (HDLFs).

Under Article 20(1)(c) of the Regulation, each Member State must monitor at least two out of the three indicators chosen in accordance with Article 11(2).

The indicators are further specified in Annex IV of the NRR. The description of the indicator 'share of agricultural land with high-diversity landscape features' includes features which are currently not covered by the standard monitoring methods referred to in Annex IV (the standard monitoring methods relate to: (i) the LUCAS methodology ([2]) and the I.21 indicator under Regulation (EU) 2021/2115 on strategic plans under the common agricultural policy for landscape features; and (ii) the farm structure surveys ([3]) for land laying fallow).

([1]) Regulation (EU) 2024/1991 of 24 June 2024 of the European Parliament and of the Council on nature restoration and amending Regulation (EU) 2022/869 (OJ L, 2024/1991, 29.7.2024, ELI: http://data.europa.eu/eli/reg/2024/1991/oj).

([2]) D`Andrimont, R. et al., Estimation of the share of Landscape Features in agricultural land based on the LUCAS 2022 survey, Publications Office of the European Union, Luxembourg, 2024, doi:10.2760/5923183, JRC135966 https://publications.jrc.ec.europa.eu/repository/handle/JRC135966, and future updates.

([3]) Now called 'integrated farm statistics survey'.

Article 14(7) of the NRR therefore states that each Member State may develop a methodology to complement the methodology referred to in Annex IV, in order to monitor HDLFs not covered by the common methods, as required by Article 20(1)(c).

To that end, Article 14(7) also states that the Commission must provide guidance on the framework for developing such methodologies.

To fulfil this obligation, this Notice provides guidance on the framework for developing monitoring methodologies for the HDLFs included in the description of the relevant indicator under Annex IV of the NRR but not covered by the common methods referred to in that Annex. It therefore provides guidance on how to develop monitoring methodologies for the productive features referred to in Annex IV of the NRR and more specifically: (i) productive trees in sustainable agroforestry systems; (ii) trees in extensive old orchards on permanent grassland; and (iii) productive elements in hedges. These can be considered as HDLFs if they comply with the conditions set out in Annex IV of the NRR, namely if they do not receive fertilizer or pesticide treatment, except for low-input treatment with solid manure, and if harvests take place only at moments where it would not compromise high biodiversity levels.

Member States are free to choose other methodological approaches (including data collection and analysis methods) that are most suited to monitor those three productive features if these methods comply with the specifications of Annex IV.

Guidance on other elements covered by the HDLF indicator (namely on non-productive landscape features and on fallow land) is already available ([4]).

Description and methodologies for determining and monitoring the indicator 'share of agricultural land with high-diversity landscape features', as per Annex IV of the NRR

Description: High-diversity landscape features, such as buffer strips, hedgerows, individual or groups of trees, tree rows, field margins, patches, ditches, streams, small wetlands, terraces, cairns, stonewalls, small ponds and cultural 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 negative 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), unless such use is necessary for the preservation of biodiversity; and

b) they should not receive fertilizer or pesticide treatment, except for low input treatment with solid manure.

Land lying fallow, including temporarily, can be considered as high diversity landscape features if it complies with criteria (a) and (b) above.

Productive trees part of sustainable agroforestry systems or trees in extensive old orchards on permanent grassland and productive elements in hedges can also be considered as high diversity landscape features, if they comply with criterion set out under (b) of the second paragraph, 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 latest updated version of LUCAS for landscape elements, Ballin M. et al., Redesign sample for Land Use/Cover Area frame Survey (LUCAS), Eurostat 2018, and for land laying fallow, Farm Structure, Reference Metadata in Single Integrated Metadata Structure, online publication, Eurostat and, where applicable, for high- diversity landscape features not covered by the methodology above, methodology developed by Member States in accordance with Article 14(7) of this Regulation.

The LUCAS methodology is updated on a regular basis to enhance the reliability of the data used in the European Union and, at national level, by Member States when implementing their national restoration plans.

([4]) For the CAP I.21 indicator, see https://publications.jrc.ec.europa.eu/repository/handle/JRC135966.
For fallow land: https://ec.europa.eu/eurostat/databrowser/view/ef_lus_allcrops__custom_13980409/default/table?lang=en.

2. MONITORING OF PRODUCTIVE HDLFs

The purpose of the present guidance is to provide the framework for developing criteria and methodology to monitor the three productive HDLFs described in Annex IV to the NRR, namely:

— productive trees in sustainable agroforestry systems, respecting the conditions set out in Annex IV;

— trees in extensive old orchards on permanent grassland, respecting the conditions set out in Annex IV;

— productive elements in hedges, respecting the conditions set out in Annex IV.

In the context of this guidance, a tree or an element in a hedge is defined as productive when it has been planted for the harvesting/use of any of its parts (fruits, bark, branches, timber) and is under active management (e.g. hedge laying, other regular cutback and sometimes grafting and pruning). Trees planted for productive purposes are considered as productive from the moment they are planted, because they will be managed accordingly from that moment.

As provided for in Article 14(7) NRR, to monitor the three productive HDLFs, Member States may develop monitoring methodologies for all or some (e.g. may be limited to only one) of the productive HDLFs included in Annex IV of the NRR.

For those three productive features, Member States may also adjust/improve already existing national methods to further meet the needs of the NRR to monitor HDLFs listed in Annex IV and not covered by the common method ([5]).

2.1. Productive trees in sustainable agroforestry systems

This section explains the procedure for identifying agroforestry areas and sustainable agroforestry and for accounting for productive trees in the identified areas.

Description

The European Commission defines agroforestry as 'a land use system in which trees are grown in combination with agriculture on the same land' ([6]).

According to a more detailed definition, agroforestry means 'land-use systems and practices where woody perennials are deliberately integrated with crops and/ or animals on the same parcel or land management unit without the intention to establish a remaining forest stand. The trees may be arranged as single stems, in rows or in groups, while grazing may also take place inside parcels (silvo-arable agroforestry, silvopastoralism, grazed or intercropped orchards) or on the limits between parcels (hedges, tree lines)' ([7]).

The Food and Agriculture Organization of the United Nations (FAO), the International Centre for Research in Agroforestry (ICRAF) / the World Agroforestry Centre (WAC) define agroforesty ([8]), ([9]) as a 'collective name for land-use systems and technologies where woody perennials […] are deliberately used on the same land-management units as agricultural crops and/ or animals, in some form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economical interactions between the different components.'

([5]) For instance, type 2 of the High Nature Value (HNV) farming indicator (impact indicator I.09 under the 2014-2022 CAP) could also include productive trees as listed under Annex IV to the NRR, such as trees in extensive old orchards on permanent grassland. Similarly, agroforestry systems as identified under the HNV indicator could be a starting point to identify sustainable agroforestry systems and productive trees therein. Type 2 refers to farmland with a mosaic of low intensity agriculture and natural and structural elements, such as field margins, hedgerows, stone walls, patches of woodland or scrub, small rivers etc.

([6]) Commission Staff Working Document, Guidelines on Biodiversity-Friendly Afforestation, Reforestation and Tree Planting, SWD(2023) 61 final.

([7]) According to the explanatory fiche on the rural development sub-measure 'Establisment of agro-forestry systems', in particular on measure 8 in Article 21(1) (b) and 23 of Regulation (EU) No 1305/2013 of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD), https://euraf.isa.utl.pt/sites/default/files/pub/docs/08_measure_fiche_art_23_agroforesty_final.pdf.

([8]) https://www.fao.org/agroforestry/about-agroforestry/overview/en.

([9]) https://www.cifor-icraf.org/knowledge/publication/33671/.

According to ICRAF, this definition implies that:

— agroforestry normally involves two or more species of plants (or plants and animals), at least one of which is a woody perennial;

— an agroforestry system always has two or more outputs;

— the cycle of an agroforestry system is always more than one year; and

— even the simplest agroforestry system is more complex, ecologically (structurally and functionally) and economically, than a mono-cropping system.

The FAO classifies agroforestry in three main types of systems (see examples in Annex II):

1. agrisilvicultural systems (a combination of trees with annual or perennial crops, such as alley cropping);

2. silvopastoral systems (a combination of trees and grazing of domesticated animals on pastures);

3. agrosilvopastoral systems: (a combination of the three elements, namely trees, animals and crops).

In summary, considering all above definitions, it can be concluded that:

— A minimum characteristic of an agroforestry system, common to most definitions, is that it deliberately combines woody perennials (trees) with crops and/ or animals.

— According to a narrow definition, an agroforestry system must have a minimum tree cover of 10 % ([10]). A broader definition requires only 5 %. A maximum tree-cover density may also be set, as in most circumstances farmland agroforestry systems combining cropping with forestry are not realistic at higher densities. However, in certain conditions, in silvopastoral systems, including wood-pastures, an almost full tree cover may still make pasture growth in the shadow of trees possible. Therefore, when needed, a maximum tree-cover density can only be set at national or regional levels.

It should be noted that trees in extensive old orchards on permanent grassland are a specific type of HDLFs and are not addressed under this category (see Section 2.2).

For identifying agroforestry areas in the context of Annex IV of the NRR, the recommended ratio of woodland/ trees and open agricultural land (grassland or cropland) is to be decided by the Member State, taking account of local pedo-climatic conditions, forestry species (applicable tree and shrubs) and the need to enable agricultural use of the land.

In the CAP Strategic Plans, each Member State can define the combination of trees with either arable land or permanent crops or grassland that shall be deemed an agricultural area (and in order to delineate agroforestry areas in the Land Parcel Identification System (LPIS)).

Member States may use those definitions (in the CAP strategic plans) to delineate agroforestry parcels, which will constitute the basis on which to identify and describe sustainable agroforestry systems. Indeed, there is no common definition in the scientific literature of either sustainable or unsustainable agroforestry; criteria for sustainability need to be determined by Member States for the purpose of Annex IV of the NRR.

Regarding reuse of Integrated Administration and Control System (IACS) spatial data, the Member States, following the obligations of the INSPIRE directive ([11]), share some geospatial (LPIS and GSA) data through the EU geoportal ([12]), notably about landscape features (see Annex III).

([10]) FAO, Zomer et al., 'Trees on Farm: Analysis of Global Extent and Geographical Patterns of Agroforestry', ICRAF Working Paper No 89, Kenya, 2009.

([11]) Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE), (OJ L 108 25.4.2007, p. 1, ELI: http://data.europa.eu/eli/dir/2007/2/2024-11-26).

([12]) https://inspire-geoportal.ec.europa.eu/srv/eng/catalog.search, Article 67 of Regulation (EU) 2021/2116 includes legal obligation on IACS data sharing.

Sustainable agroforestry has multiple benefits, such as improved farmer livelihoods as a result of higher income, increased biodiversity, improved soil structure and health, reduced erosion, and carbon sequestration ([13]). In many parts of the world, farmers working in sustainable agroforestry also report increased yields ([14]).

However, environmental sustainability ([15]) can be compromised by multiple factors, alone or in combination, such as changing tree density, application of pesticides and/ or fertilisers, under-grazing and over-grazing.

Methodology

In order to account for productive trees in sustainable agroforestry systems that fulfil the conditions set out in Annex IV of NRR, it is recommended that Member States follow the steps set out in the six numbered bullet points below.

(1) Identify agroforestry areas in the area of reference ([16]) by using existing national maps of such areas, provided these maps are of sufficient quality. Other available sources of information can also be used if the agroforestry classes in those other available sources are in line with Member States' definitions. For example, a Member State may use the most recent information recorded in its LPIS, if available, for the delineation of agricultural area, to distinguish between arable land, permanent grassland and permanent crops and to identify agroforestry systems (Article 2(7)(b) of Regulation (EU) 2022/1172). Depending on the definition a Member State has opted for, the LPIS legend could contain classes such as 'Agrosilviculture' or 'Agroforestry with grass underneath (20 % of trees)' or 'Agroforestry with grass underneath (50 % of trees)'. Member States may also use additional information stemming from the annual farmers' claims made through the Geospatial Application System (GSA). The results of the Area Monitoring System (AMS) can serve to confirm some recorded information.

An alternative or complementary approach could be to identify agroforestry areas based on the mapping of related habitat types according to EUNIS ([17]) and Annex I of the Habitats Directive. Alternatively, if no other information is available, a rough estimate could be found in the Corine Land Cover inventory (Class 2.4.4 'Agro-forestry areas') ([18]).

In addition, LUCAS Core may be used to derive the probability of occurrence of agro-forestry ([19]), as a support to the identification.

(2) Define sustainable agroforestry systems (within the agroforestry areas previously identified) according to biogeographical specificities in the Member State or a region thereof and by specific type of agroforestry. Member States could do this by setting thresholds, for instance, for: (i) tree density (e.g. deciding on minimum and maximum tree densities); (ii) conditions, timing, and/ or duration of grazing (e.g. Member States should decide on minimum and maximum livestock densities).

Decide on what types of management would disqualify the system from being considered sustainable: e.g. removal of snags and coarse woody debris; plantations of invasive alien species or of exotic species that have little benefit for biodiversity; densely planted short-rotation coppice/ fast-growing trees.

([13]) Eurostat Integrated Farm Statistic Manual https://wikis.ec.europa.eu/display/IFS/3.5+IFS+Soil+management.
([14]) https://wikis.ec.europa.eu/display/IMAP ('Impacts of farming practices on environment and climate' 'Farming practices (fiches)': 'Agroforestry').
([15]) Social and economic dimensions of sustainability are not part of this guidance.
([16]) See Chapter 4.
([17]) European Nature Information System, https://eunis.eea.europa.eu/habitats.jsp.
([18]) The Corine Land Cover inventory is produced by the European Environment Agency's Copernicus Land Monitoring Service and provides information on European land cover/land use. https://land.copernicus.eu/en/products/corine-land-cover and https://land.copernicus.eu/content/corine-land-cover-nomenclature-guidelines/html/index-clc-244.html.
([19]) https://ec.europa.eu/eurostat/documents/205002/8072634/LUCAS-Agro-forestry-report.pdf.

(3) When defining sustainable agroforestry, it is recommended that Member States use the following two criteria:

— The first criterion is the design of the agroforestry system (e.g. diverse species composition, native species, site-specific tree/ shrub density, etc.). As a general rule, and subject to pedoclimatic limitations, more biodiversity benefits are obtained from agroforestry systems with deciduous trees and/ or hardwood species such as olives, chestnuts, walnuts and cherry species.

— The second criterion is the nature of management. There should be appropriate management (including soil management) to ensure the sustainability of the system (combined with the reduction of fire risk) and strategies that foster heterogeneity. This means there should be proper harvesting, especially in terms of the frequency of harvesting, etc. (e.g. mature stands that are well maintained through delayed and flexible harvesting have the capacity to store more carbon than young stands, whereas short-rotation coppice with high disturbance levels and intensive use of land has low biodiversity and carbon-storage benefits).

Examples of agroforestry systems with the potential for sustainability, based on land management and/ or ecosystem services delivered, can be found in Annex II of this document.

(4) Exclude trees ([20]) that receive pesticide and/ or fertiliser treatment (except fertilisation by low input of solid manure). Member States should define what they consider to be 'low inputs' of solid manure; and they can do this on the basis of relevant scientific studies. A 'maximum' level of input treatment should be set at national level. Scientific evidence points to the range of 30 to 50 kilograms of nitrogen input per hectare and per year (30-50 kg N ha-1 y-1) ([21]).

(5) Exclude trees where harvesting is done at times that compromise high biodiversity levels, including removing wood or mowing at an inappropriate time ([22]).

Steps (4) and (5) can be assessed by using one or a combination of the following approaches and/ or data sources:

— a declaration from the farmer (Member States could request this information as part of the CAP payment claim if the farmer applies for area-related CAP support or aid under national schemes, e.g. State Aid);

— information, if available, from EU, national or other funding schemes for maintaining or setting up sustainable agroforestry systems as described in this guidance and compliant with the conditions of Annex IV;

— an on-the-spot survey, organised by the competent authorities in the Member State, verifying the conditions:

— by checking compliance with condition (b) ([23]), set out in Annex IV, by means of interviews;

or

— by checking the biodiversity value of the landscape features, e.g. by using EMBAL ([24]) (see Annex I) or any other appropriate tools as decided by the Member State and setting a suitable threshold for the characteristics describing the biodiversity value of trees.

([20]) In order to comply with the conditions set out in the indicator description in Annex IV of the NRR.
([21]) EU Agricultural Outlook for markets and income 2018-2030 https://agriculture.ec.europa.eu/system/files/2021-01/medium-term-outlook-2018-report_en_0.pdf.
([22]) See for example the timing restrictions in eco-schemes and agro-environmental measures targeted at biodiversity in common agricultural policy strategic plans under Regulation (EU) 2021/2115 of the European Parliament and of the Council – Article 31 and Article 70.
([23]) Condition b: 'they should not receive fertilizer or pesticide treatment, except for low input treatment with solid manure'.
([24]) EMBAL is an applicable solution when a statistically representative sample is appropriately defined and surveyed.

(6) Finally, estimate the tree-covered area. Given that only the productive trees count as landscape features, and not the entire parcel, tree-cover area has to be estimated. Once parcels of sustainable agroforestry are identified/delineated, the area covered by trees can be measured/ estimated using the following data sources:

— orthophotos;

— Copernicus Land Monitoring Service (CLMS) tree-cover density ([25]);

— field surveys;

— satellite images of suitable resolution;

— if available, agroforestry management plans, provided those include such information ([26]).

2.2. **Trees in extensive old orchards on permanent grassland**

This section explains the procedure for identifying extensive old orchards on permanent grassland and accounting for the trees therein that fulfil the conditions set out in Annex IV of the NRR. Old orchard refers to an established orchard that has been in existence for a long time, usually with mature fruit-bearing or nut trees. Extensive orchards are orchards planted at low tree densities (compared to intensive systems), in permanent grassland. The spacing of the trees varies according to fruit variety. For permanent grassland, the CAP definition as set in Article 4(3)(c) of Regulation (EU) 2115/2021 can be used.

Description

Extensive old orchards are structurally and ecologically similar to certain types of agroforestry (e.g. wood-pastures), with open-grown trees set in herbaceous vegetation, but can be distinguished from agroforestry by the following five characteristics ([27]):

— composition: Orchards typically consist of fruit- and/ or nut-bearing tree species e.g. apples, pears, cherries, gages, plums, quinces, peaches, walnuts or hazelnuts (e.g. Rosaceae, Juglandaceae);

— the usually denser arrangement of the trees in old orchards on permanent grassland;

— the usually smaller scale of individual habitat patches compared to agroforestry;

— trees in extensive old orchards are grown for fruit and nut production, usually achieved through activities such as grafting and pruning, whereas trees in traditional agroforestry might also be grown for their wood (to be used in paper-making, furniture, etc.), cork, acorns and other uses;

— grazing or cutting of herbaceous vegetation, which are integral to orchard management. This can also be practised in some agro-forestry systems.

Member States may use these five specific characteristics to identify these areas, depending on local conditions and traditions.

Methodology

In order to account for trees in extensive old orchards on permanent grassland that fulfil the conditions set out in Annex IV of the NRR, it is recommended that Member States take the following steps set out in the five numbered bullet points below.

(1) Identify and map orchard parcels through national or regional inventories, maps or censuses, where available (an inventory of old orchards may already be available).

([25]) https://land.copernicus.eu/en/products/high-resolution-layer-tree-cover-density.
([26]) This guidance does not ask Member States to develop such agroforestry management plans. However, if such plans are in place, they could be used as a source of information.
([27]) UK Biodiversity Action Plan Priority Habitat Descriptions, Traditional Orchards, https://data.jncc.gov.uk/data/2829ce47-1ca5-41e7-bc1a-871c1cc0b3ae/UKBAP-BAPHabitats-56-TraditionalOrchards.pdf.

If a national inventory is not available, information on orchard parcels available in the LPIS/ Geospatial Application (GSA)/ Area Monitoring System of the CAP, can be combined with information derived from orthophotos, high-resolution remote-sensing multitemporal images or direct surveys (organised by the competent authority of the Member State), making sure that only orchards on permanent grasslands are identified.

(2) Define 'extensive old orchards', according to the particularities of the country (e.g. local conditions and traditions), by defining both 'extensive' and 'old' (e.g. based on type/ intensity of management and average tree age or presence/ coverage/ share of old trees), and by setting thresholds for maximum and minimum tree density, as needed.

(3) Exclude trees that receive pesticide and/ or fertiliser treatment. Member States should define what they consider to be 'low inputs' of solid manure; they can do this on the basis of relevant scientific studies. A 'maximum' level of input treatment with solid manure should be set at national level. Scientific evidence points to the range of 30 to 50 kg of N input ha^{-1} y^{-1}.

(4) Exclude trees where harvesting is done at times that compromise high biodiversity levels.

Steps (3) and (4) can be assessed by using one or a combination of the following three data sources:

— a declaration from the farmer (Member States can request this information as part of the CAP payment claim if the farmer applies for area-related CAP support or aid under national schemes);

— information, if available, from EU, national or other funding schemes for conservation, restoration and/ or maintenance of extensive old orchards as described in this guidance and complying with the conditions of Annex IV;

— an on-the-spot survey, organised by the competent authority in the Member State, verifying the conditions:

  — by checking compliance with condition (b), by means of interviews;

    or

  — by checking the biodiversity value of the landscape features, e.g. by using EMBAL (see Annex I) or a similar approach, and setting a suitable threshold for the characteristics describing the biodiversity value of trees.

(5) Finally, estimate the tree-covered area: given that only the productive trees count as landscape features, and not the entire parcel, tree-covered area has to be estimated. Once parcels of extensive old orchards on permanent grassland are identified and delineated, the area covered by trees can be measured/ estimated using the following sources:

  — orthophotos;

  — Copernicus Land Monitoring Service (CLMS) tree-cover density;

  — field surveys;

  — satellite images of suitable resolution.

2.3. **Productive elements in hedges**

This section explains the procedure for accounting for productive elements in hedges that comply with the criteria set out in Annex IV of the NRR.

Description

Member States would have to identify productive elements in hedges (e.g. fruit trees and berries), which do not receive pesticide and/ or fertiliser treatment (except low input of solid manure), and which are not harvested at times that would compromise high biodiversity levels.

Methodology

Identification: Productive elements in hedges can be assessed by using one or a combination of the data sources and/ or approaches set out in the four bullet points below:

— a declaration from the farmer (Member States could request this information as part of the CAP payment claim if the farmer applies for area-related CAP support or aid under national schemes, e.g. State Aid);

— if available, EU, national or other funding schemes for: (i) setting, maintaining and conserving hedges; or (ii) retaining and/ or maintaining linear features composed of perennial woody vegetation (productive shrubs and/ or trees) as described in this guidance and complying with the conditions of Annex IV.

— Productive elements can also be assessed using direct observation through the EMBAL survey (see Annex I), or equivalent surveys in which the natural value of landscape features is assessed, combined with a check of compliance with condition (b), by means of interviews with farmers.

— Finally and depending on local specificities, a Member State may provide an estimate of productive elements based on statistical sampling and analysis, provided this estimate complies with the conditions in Annex IV of the NRR and uses appropriate sampling procedures.

In order to check compliance with condition b), Member States should define what they consider to be 'low inputs' of solid manure; they can do this on the basis of relevant scientific studies. A 'maximum' level for what can be considered low-input treatment with solid manure should be set at national level. Scientific evidence points to the range of 30 to 50 kg N input ha^{-1} y^{-1}.

For the purpose of identifying the hedges that are on agricultural land, the guidelines for identification of hedges according to the LUCAS Landscape Features module can be followed ([28]).

Estimating the area covered: Given that only the productive elements count as landscape features, and not the entire hedge, the area covered has to be estimated. Once productive elements in hedges are identified, the area can be estimated using the following sources:

— orthophotos;

— Copernicus Land Monitoring Service (CLMS) tree-cover density (in the case of trees);

— field surveys;

— satellite images of suitable resolution.

3. **BASELINE VALUE OF THE HDLF INDICATOR**

In order to keep track of the progress and fulfilment of the obligations set by the NRR, Member States that have selected the HDLF indicator to comply with Article 11(2), are required under Article 20 to monitor the 'share of agricultural land with high-diversity landscape features' at least every 6 years as from the date of entry into force of the NRR (i.e. 18th August 2024), or, where necessary to evaluate the achievement of increasing trends to 2030, within a shorter interval. Moreover, according to Article 15(3)(j) of the NRR, the national restoration plans NRPs must include, among other items, 'an account of the indicators for agricultural ecosystems chosen in accordance with Article 11(2), and their suitability to demonstrate the enhancement of biodiversity in agricultural ecosystems within the Member State concerned'. Where Member States select the 'share of agricultural land with high-diversity landscape features' to comply with Article 11(2), they may include baseline values for this indicator in their national restoration plans, in order to better assess the progress that needs to be made in order to reach an increasing trend for this indicator in line with Article 11(2) of the NRR.

The baseline is the value of the indicator based on the monitoring data at the date of entry into force of the NRR, or based on the most recent data acquired before the entry into force.

([28]) https://ec.europa.eu/eurostat/documents/205002/13686460/C1-LUCAS-2022.pdf, p127.

4. **AREA OF REFERENCE**

The indicator in the NRR is share of agricultural land with high-diversity landscape features which means that HDLFs on all agricultural areas (agricultural area as under CAP indicator I.21) can be counted (as long as the requirements under a) and b) are met).

The indicator is the ratio (%) between the area covered by HDLFs (inside agricultural areas) and the utilised agricultural area (UAA) ([29]).

To calculate the NRR indicator for HDLFs, the numerator of the CAP I.21 indicator is summed up with the area of the other components (namely: fallow land and the productive HDLFs as listed in Annex IV and as chosen by the Member State) and the resulting sum is then divided by the UAA ([30]).

The different components of the HDLF indicator should therefore be identified as belonging to productive agricultural land as defined in the LUCAS Landscape Feature module ([31]) used as the basis for the methodology proposed in Annex IV (CAP I.21 indicator). Productive agricultural land is all land actively used for agriculture, including temporarily non-productive parcels (fallows), which are otherwise available for agricultural production. Residential and leisure gardens, including kitchen gardens, do not belong to this definition of agricultural land. Unutilised Agricultural Area ([32]) is not included.

([29]) https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Utilised_agricultural_area_(UAA).

([30]) A study by the JRC shows that the degree of correlation between the UAA extent and the agricultural land extent as calculated in the CAP I.21 indicator is very strong. D'Andrimont R. et al., Estimation of the share of Landscape Features in agricultural land based on the LUCAS 2022 survey, Publications Office of the European Union, Luxembourg, 2024, doi:10.2760/5923183, JRC135966, https://publications.jrc.ec.europa.eu/repository/handle/JRC135966.

([31]) LUCAS 2022 (Land Use / Cover Area Frame Survey), Technical reference document C1, Instructions for Surveyors, https://ec.europa.eu/eurostat/documents/205002/13686460/C1-LUCAS-2022.pdf.

([32]) https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Unutilised_agricultural_area_(NUAA), p137.

ANNEX I

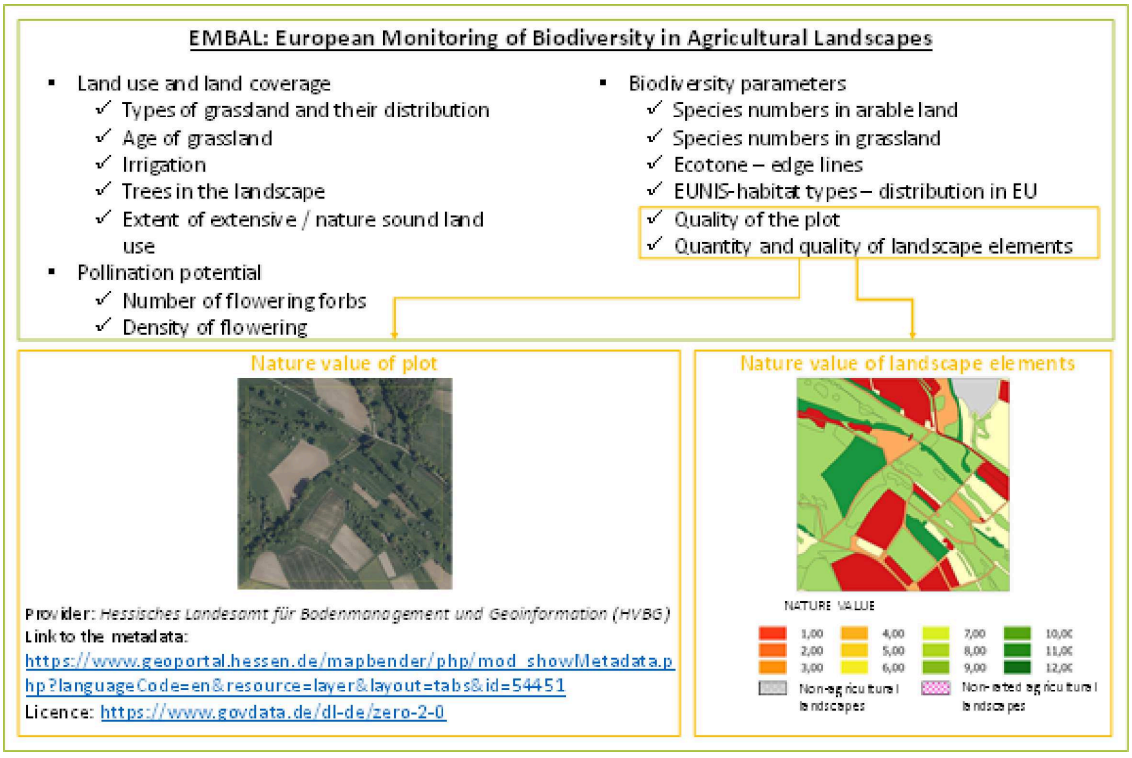
European Monitoring of Biodiversity in Agricultural Landscapes (EMBAL)

EMBAL ([1]) is a robust monitoring tool for collecting information on the state of biodiversity in agricultural landscapes in EU Member States. It is a standardised field survey (*in situ* data collection), which is used for several purposes, including: (i) recording the land cover/ use, types, extent and quality of landscape elements within the agricultural landscape; and (ii) recording the habitat types (EUNIS classification) within the agricultural landscape.

The Commission launched EMBAL in all 27 EU countries in 2022 and 2023, surveying 3 000 randomly sampled plots. Each survey plot covered an area of 500 x 500 m, and the number of plots per country ranged from 30 to 250, depending on the country area and the respective share of agricultural land. In each plot, all the landscape elements were recorded, and a trained surveyor evaluated them in terms of quality (i.e. nature value) according to a list of parameters (e.g. element type, number and density of forbs and flowers, abundance and richness of indicator plant species, etc.). The EMBAL methodology is fully harmonised with the LUCAS survey.

Figure 1

Information collected (selection) in the EMBAL survey and example of the 'nature value' assigned both to the survey plot and to the landscape features in it



([1]) https://wikis.ec.europa.eu/pages/viewpage.action?pageId=25560696.

ANNEX II

Agroforestry systems [1]

1. Agrisilvicultural

Definition: agroforestry systems comprised of woody vegetation intercropped with annual or perennial crops (crops and trees) [2].

Includes cropped fields where trees are either loosely distributed or integrated into the field in rows. This also includes 'alley cropping', e.g. with strips of fast-growing short-rotation shrubs. It may include native tree species or cultivated trees such as fruit trees or bushes.

Figure 2

Apple trees and vegetables

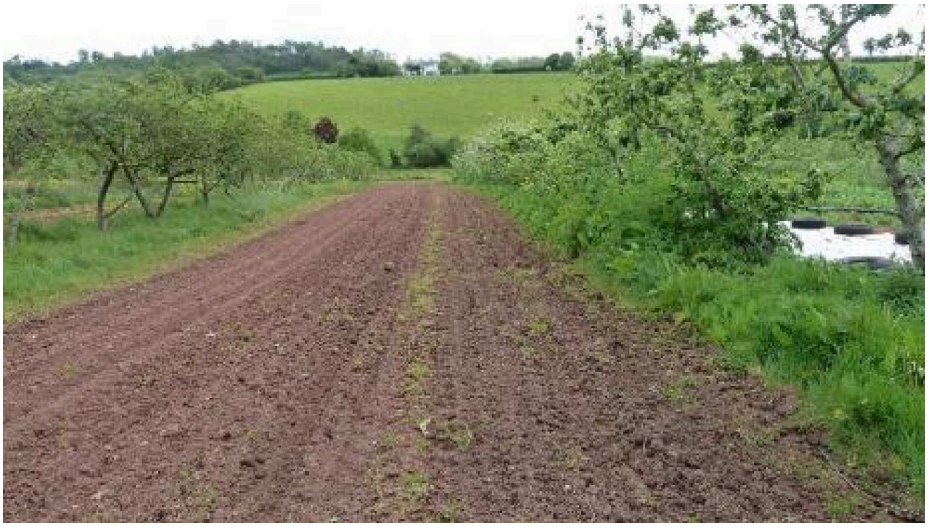


Figure 3

Trees and black barley

[1] All photos from AGFORWARD Project, https://www.flickr.com/photos/agforward/.

[2] McAdam, J.H. et al., 'Classifications and Functions of Agroforestry Systems in Europe' in Rigueiro-Rodríguez, A., McAdam, J., Mosquera-Losada, M.R., eds., *Agroforestry in Europe. Advances in Agroforestry*, vol 6. Springer, Dordrecht, 2009, https://doi.org/10.1007/978-1-4020-8272-6_2.

Figure 4

Brassica alley (newly established agroforestry parcel)

Figure 5

Oak trees and lavender

Figure 6

Quercus suber with oats

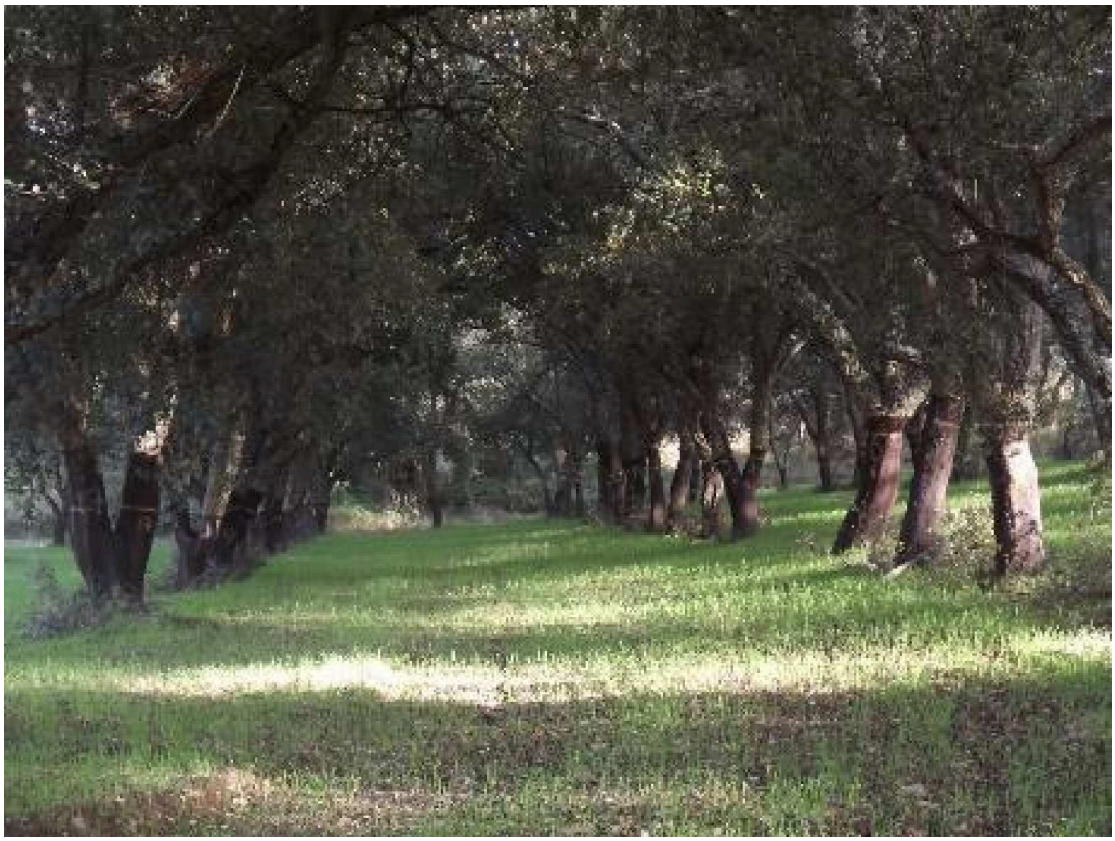


Figure 7

Silvoarable system

2. **Silvopastoral**

Definition: agroforestry systems combining woody vegetation with forage and animal production (pasture/ animals and trees) ([3]).

Includes systems such as traditional wooded pastures, as well as newly planted agroforestry systems composed of trees and pastures where domesticated animals (e.g. cattle, pigs, sheep, goats, poultry) graze in the same parcel.

Habitats classified in EUNIS that could potentially correspond to such agroforestry system are: hemiboreal and boreal wooded pasture and meadow ([4]), Mediterranean wooded pasture and meadow, temperate wooded pasture and meadow.

Potential habitats in Annex I of the Habitats Directive corresponding to such systems are: Fennoscandian wooded pasture and dehesas with evergreen Quercus spp.

Figure 8

Montado with grazing livestock

([3]) McAdam et al., ibid.
([4]) https://forum.eionet.europa.eu/european-red-list-habitats/library/terrestrial-habitats/e.-grasslands/e7.2-hemiboreal-and-boreal-wooded-pasture-and-meadow/download/en/1/E7.2 Hemiboreal and boreal wooded pasture and meadow.pdf.

Figure 9

Grazed orchard (apple trees)

Figure 10

Sheep grazing in an orchard (©Pixabay n.d.)

Figure 11

Silvopastoral system

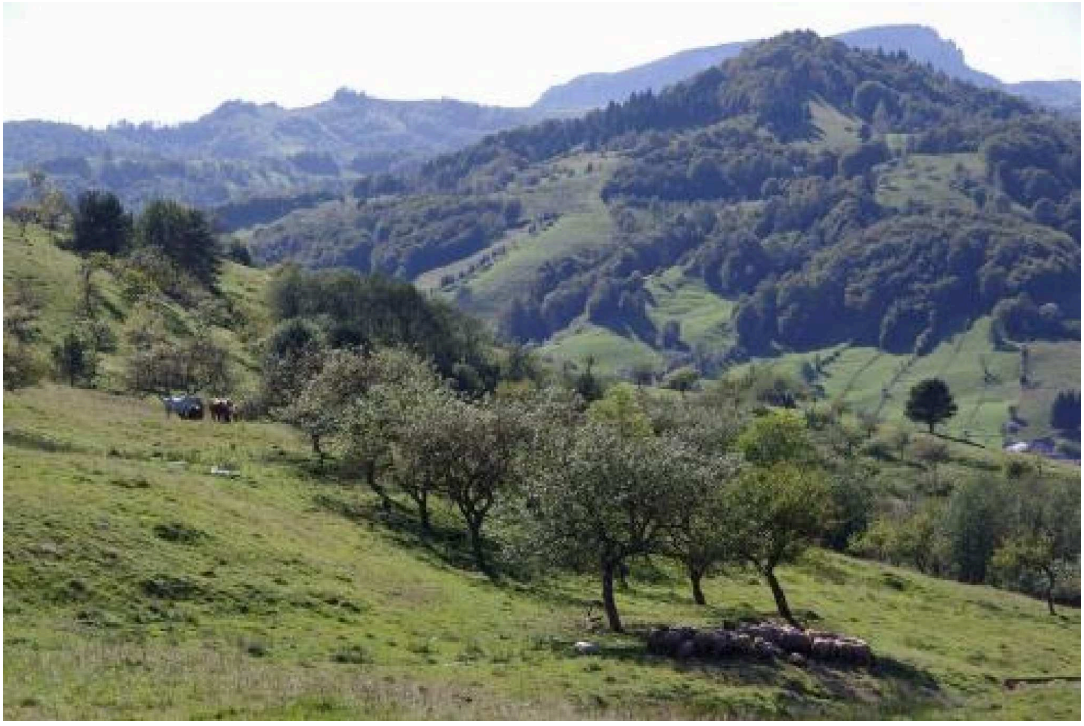
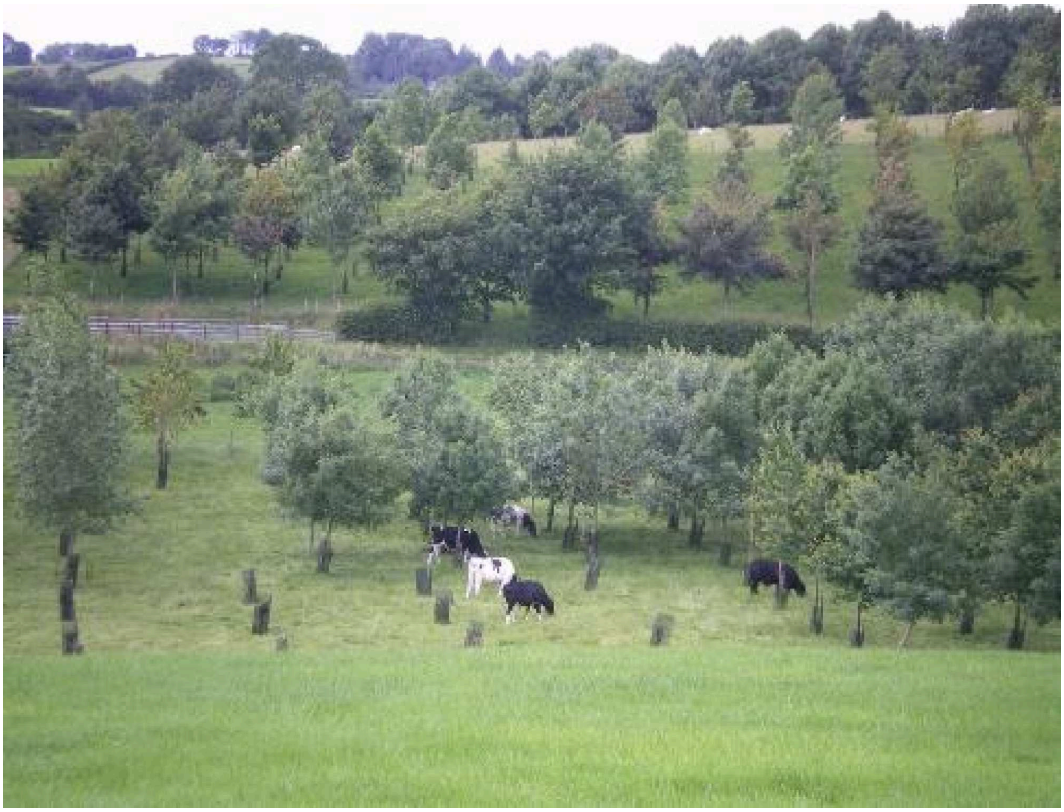


Figure 12

Silvopastoral system



3. **Agrosilvopastoral**

Agrosilvopastoral: Definition: agroforestry systems combining woody vegetation with forage and animal production and annual or perennial crops (crops, pasture/ animals and trees) ([5]). for example, agroforestry systems including trees and crops in the same parcel, where animals graze after crops (often cereals) have been harvested. In the agrosilvopastoral system, the arable and livestock components are usually temporally and spatially distinct ([6]).

Trees may be forest species or cultivated trees, managed for harvesting/use of their parts (fruits, bark, branches, timber); crops may be annual or perennial species; and animals may be cattle, pigs, sheep, goats and poultry.

Figure 13

Montado and cereals (presence of grazing animals at certain times of the year)

([5]) McAdam et al., ibid.
([6]) Antonio Rigueiro-Rodríguez et al., *Agroforestry in Europe: Current Status and Future Prospects*, Spinger Dordrecht, 2009, https://doi.org/10.1007/978-1-4020-8272-6.

Figure 14

Montado in Portugal

ANNEX III

IACS geospatial data from LPIS and GSA

The Integrated Administration and Control System (IACS) consists of several digital and interconnected databases, in particular: a system for identifying all agricultural plots in EU Member States called the Land Parcel Identification System (LPIS), a system that allows the farmers to graphically declare the agricultural areas for which they apply for support (the geospatial application GSA), an area monitoring system (AMS) used to observe, track and assess agricultural activities.

The European Commission has set up a process for better accessing and reusing spatial IACS data ([1]).

To improve the IACS data availability, the European Commission has established an IACS data-sharing process ([2]) to be implemented by the Member States. Thanks to the underpinning INSPIRE Directive, the Member States must share their spatial data if relevant for the EU environmental policy (e.g. Green Deal policies on biodiversity, soil, climate).

([1]) Those data are managed by Member States (Coordination Bodies and Paying Agencies). It concerns data in LPIS and GSA, but not from AMS for now.

([2]) The Member States follow the following Technical guidelines on IACS spatial data sharing: Part 1: Data discovery: https://op.europa.eu/en/publication-detail/-/publication/f09b0355-f7c5-11ea-991b-01aa75ed71a1/language-en; and Part 2: Interoperability: https://op.europa.eu/en/publication-detail/-/publication/0a048b9e-431c-11ef-865a-01aa75ed71a1/language-en.