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ANNEX

ANNEX

to the

Commission Delegated Regulation

supplementing Regulation (EU) 2024/3012 of the European Parliament and of the Council by establishing the certification methodologies for carbon farming activities

ANNEX

CERTIFICATION METHODOLOGIES REFERRED TO IN ARTICLES 1, 2 AND 3

DEFINITIONS

For the purposes of this Annex, the following definitions shall apply:

(1) ‘eligible activity’ means an activity that is eligible for certification under Regulation (EU) 2024/3012;

(2) ‘permanent grassland’ means land that is used to grow grasses or other herbaceous forage naturally or through cultivation and that has not been included in the crop rotation of the operator for five years or more and, where Member States so decide, that has not been ploughed up, or tilled, or reseeded with different types of grass or other herbaceous forage, for five years or more;

(3) ‘organic soil’ means organic soil as established in accordance with the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines[1] (‘2006 IPCC Guidelines’) or under national definitions accepted under greenhouse gas (GHG) inventories reporting. Soils that are not organic are mineral soils;

(4) ‘water table depth’ means the height of the phreatic water surface relative to the soil surface;

(5) ‘activity area’ means the spatially delimited area or areas where the activity takes place;

(6) ‘peat’ means soil material that consists of partially decomposed plant material, that has accumulated under conditions of waterlogging;

(7) ‘certification period’ means the period between a re-certification audit and the certification audit or the most recent preceding re-certification audit;

(8) ‘renewal’ means the start of a new activity period and the prolongation of the ongoing monitoring period;

(9) ‘peat depletion time’ means the time period over which the total peat layer would disappear in the absence of the activity;

(10) ‘stratum’ means an area presenting homogenous biophysical conditions, such as climate and soil type, and management history;

(11) ‘calibration’ means a process involving the adjustment of parameters and constants within a model so that it predicts the measured values more accurately;

(12) ‘validation’ means the process of evaluating the performance of a model with regard to measured values, demonstrating its satisfactory performance in terms of suitability and characterisation of model prediction error.

[1] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4 ‘Agriculture, Forestry and Other Land Use’, Chapter 3 ‘Default climate and soil classifications’, Annex 3A.5 .

1. DESCRIPTION OF THE CARBON FARMING ACTIVITY

1.1. Eligibility criteria

1.1.1. Agriculture and agroforestry on mineral soils

1.1.1.1. Eligible activity

The eligible activity shall be carried out on agricultural mineral soils (cropland and grassland) and cover one or more practices from the following non-exhaustive list:

(a) agricultural practices that increase net carbon removals in soils or reduce net CO_2 emissions from soils, such as:

  (i) improved crop management that increases soil cover and/or that increases carbon input to the soil, such as cover crops, crop rotations, crop residues retention;

  (ii) conservation tillage practices that reduce soil disturbances;

  (iii) conversion of cropland to grassland;

  (iv) improved grassland management such as rotational grazing or mixed swards;

  (v) use of organic soil improvers[2] or organic fertilisers[3];

(b) agroforestry practices that increase net carbon removals in living biomass, such as:

  (i) tree planting inside parcels, such as silvopastoral or silvoarable agroforestry;

  (ii) planting of woody elements between parcels, such as hedges or other landscape features;

  (iii) new perennial woody crops;

(c) agricultural and agroforestry practices that reduce direct and indirect N_2O emissions from managed agricultural soils, such as:

  (i) precision fertilisation;

  (ii) replacement of mineral nitrogen fertilisers by growing leguminous crops, or by using soil improvers or plant biostimulants[4];

  (iii) change in type of fertilising products;

  (iv) use of nitrification, denitrification or urease inhibitors.

Several practices may be combined within the activity area.

1.1.1.2. Eligibility requirements

The following eligibility requirements shall apply:

(a) the activity shall not result in the removal of existing trees or other woody elements;

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2 In line with Product Function Categories listed in Annex I, Part I, 3, of Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003 (OJ L 170, 25.6.2019, p. 1, ELI: http://data.europa.eu/eli/reg/2019/1009/oj)

3 In line with Product Function Categories listed in Annex I, Part I, 1(a) of Regulation (EU) 2019/1009.

4 In line with Product Function Categories listed in Annex I, Part I, 6 of Regulation (EU) 2019/1009.

(b) the activity shall not take place on land where the water table has been artificially lowered with new drainage systems after 1 January 2023;

(c) conservation tillage practices referred to in Section 1.1.1.1, point (a)(ii) are eligible only if combined with practices over the rotation that increase the carbon input into the soils;

(d) conversion of cropland to grassland referred to in Section 1.1.1.1, point (a)(iii) and improved grassland management referred to in Section 1.1.1.1, point (a)(iv) shall not take place on land where permanent grassland was converted to cropland after 1 January 2023;

(e) the practices referred to in section 1.1.1.1, point (a)(v) are eligible only if combined with the improved crop management practices over the rotation referred to in section 1.1.1.1, point (a)(i);

(f) with regard to practices referred to in Section 1.1.1.1, point (a)(v), biochar may be applied only where the quantification approach allows to exclude the permanent fraction of carbon in the biochar[5] from the quantification of soil organic carbon stocks;

(g) the practices referred to in Section 1.1.1.1, point (b), shall not take place on land where existing agroforestry systems were removed after 1 January 2023, save where this occurred for the purposes of control of fire, pest or windthrow events;

(h) the practices referred to in Section 1.1.1.1., point (c), are eligible only if they complement the practices referred to in point (a) or point (b) of that Section and shall aim to improve the nitrogen use efficiency of crop production, that is, the ratio between the nitrogen removed by the harvested crop and the nitrogen applied to the soil, and to maintain crop production levels on the activity area;

(i) the activity shall maintain riparian buffer zones, such as riparian forests, buffer strips, meadows or pastures, along streams in the activity area, in accordance with Directive 2009/128/EC of the European Parliament and of the Council[6].

For the purposes of the practices referred to in Section 1.1.1.1., point (b), management practices shall be carried out in a way that minimises negative impacts on soil quality and soil health. Unsuitable tree species as a result of the risk assessment carried out under Section 4.1.2 shall not be eligible. For the purposes of the practices referred to in Section 1.1.1.1, point (b)(iii), at least one agricultural practice listed in section (a) shall be carried out.

1.1.2. Rewetting and restoration of peatlands and of other organic soils

1.1.2.1. Eligible activity

The eligible activity shall result in the rise of the water table in organic soils and peatlands and may cover the following practices:

(a) blocking, damming, infilling or removing of drainage structures;

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5 Falling within the scope of Commission Delegated Regulation EU 2026/285 supplementing Regulation (EU) 2024/3012 of the European Parliament and of the Council by establishing the certification methodologies for permanent carbon removals activities.

6 Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides (OJ L 309, 24.11.2009, p. 71, ELI: http://data.europa.eu/eli/dir/2009/128/oj).

(b) reducing or stopping water extraction, including in the mineral catchment area and in groundwater, and creating or facilitating aboveground structures that hamper rainwater surface run-off.

The practices referred to in the first paragraph may be combined with:

(a) the active re-establishment of peat-forming vegetation and shallow removal of degraded topsoil or atypical vegetation;

(b) the application of paludiculture.

1.1.2.2. Eligibility requirements

The following eligibility requirements shall apply:

(a) the activity shall not take place on land where the water table was artificially lowered with new drainage systems after 1 January 2023;

(b) mineral soils may be included in the activity area if the changes in emissions on those soils as a result of the activity are accounted for;

(c) no peat extraction shall take place in the activity area;

(d) the activity shall include practices[7] to mitigate any risks to its viability, in accordance with national or sub-national requirements, where applicable;

(e) for paludiculture as referred to in Section 1.1.2.1, second paragraph, point (b), the following shall apply:

(a) soil disturbance shall be minimised when seeding, managing or harvesting, in line with best available practices;

(b) below-ground biomass shall not be harvested and mosses may only be harvested from sites where they are actively cultivated.

1.1.3. Afforestation

1.1.3.1. Eligible activity

The eligible activity shall result in the afforestation of:

(a) grassland;

(b) cropland;

(c) land where in the 20 years prior to the start of the activity period the combined tree crown cover of existing sparse trees was smaller than 10 % of the activity area.

The activity may include direct planting and seeding and practices that enable or facilitate natural regeneration.

1.1.3.2. Eligibility requirements

The following eligibility requirements shall apply:

(a) Afforestation on grassland as referred to in Section 1.1.3.1, point (a), and afforestation on cropland as referred to in Section 1.1.3.1, point (b), shall not take

[7] Such as raising humidity levels by increasing the vegetation cover or the reduction of water extraction in the river basin. Certification schemes may provide additional guidance on these risk mitigation practices.

place on land where the combined tree crown cover of existing sparse trees was larger than 10 % of the activity area after 1 January 2023;

(b) the activity shall not result in the removal of existing trees or other woody elements, save where they are included in the list of invasive alien species of Union concern pursuant to Commission Implementing Regulation (EU) 2016/1141[8] or if their removal is shown to be necessary to limit the spread of pathogens;

(c) the minimum size of the activity area shall be 0,5 ha;

(d) the activity may take place on peatlands only if they are subject to rewetting;

(e) on organic soils other than peatlands, the activity shall not result in the lowering of the water table or in any form of soil degradation;

(f) the activity shall reflect the species composition that is typical of the local natural conditions determined by soil, hydrological and climate conditions and specific local factors like wind exposure;

(g) mixed species composition shall be the common approach, whereby a single species may be applied in cases where this reflects natural species composition and this is the most appropriate species adapted to climate and soil conditions;

(h) with the exception of natural regeneration, the planting density throughout the activity period shall be in line with planting densities or with equivalent requirements applicable in the Member State where the activity is implemented;

(i) management practices shall be carried out in a way that minimises negative impacts on soil quality and soil health. In particular:

  (i) tillage shall be allowed only for the purpose of site preparation and planting/seeding, either at the start of the activity or if trees are planted at later stages to recover losses from failure or harvest;

  (ii) on cropland, tillage not exceeding 15 cm of depth shall be preferred, whereas tillage up to 30 cm of depth may be applied, where needed to ensure successful establishment of the planted trees.

  (iii) on permanent grassland, no tillage shall be applied;

  (iv) mowing shall be allowed only to the extent and duration that is necessary to provide growth space for the trees and for the purposes of fire prevention.

For the purposes of the first paragraph, point (f), unsuitable tree species as a result of the risk assessment carried out in accordance with Section 4.1.2 shall not be eligible, except for species for which historical or experimental success as well as potential future suitability in the region is demonstrated in the activity plan referred to in Section 1.3.1. Non-native species shall not be used, except where it is demonstrated that the native species and their provenances are no longer adapted to the projected climatic and pedo-hydrological conditions of the activity area and that the selection of the non-native species, including their forest reproductive material, does not harm ecosystem conditions.

[8] Commission Implementing Regulation (EU) 2016/1141 of 13 July 2016 adopting a list of invasive alien species of Union concern pursuant to Regulation (EU) No 1143/2014 of the European Parliament and of the Council (OJ L 189, 14.7.2016, p. 4, ELI: http://data.europa.eu/eli/reg_impl/2016/1141/oj).

For the purposes of the first paragraph, point (g), where the initial growing conditions have improved, operators shall introduce additional species, including through natural establishment, that shall be subject to the conditions laid down in the first paragraph, point (f).

Where the provision of first paragraph, point (i)(iii) cannot be complied with due to local soil conditions, tillage up to 30 cm of depth may be applied and the relevant justification shall be included in the activity plan.

1.2. Activity period and monitoring period

1.2.1. Agriculture and agroforestry on mineral soils

1.2.1.1. Activity period

The duration of the activity period shall be:

(a) for the practices referred to in Section 1.1.1.1, points (a) and (c): five years, renewable up to three times for periods of the same duration;

(b) for the practices referred to in Section 1.1.1.1, point (b): 15 years, renewable once for a period of the same duration.

At the time of submission of the activity plan referred to in Section 1.3.1, operators or groups of operators may already commit to an overall activity period of maximum 20 years for the practices referred to in Section 1.1.1.1, points (a) and (c), or of maximum 30 years for the practices referred to in Section 1.1.1.1, point (b).

1.2.1.2. Monitoring period

The monitoring period shall start at the same time as the first activity period and shall end:

(a) for practices that increase net carbon removals in soils or in living biomass, as referred to in Section 1.1.1.1, points (a) and (b): 5 years later than the first activity period or, in the event of renewals, 5 years later than the new activity period;

(b) for practices that reduce net CO_2 emissions from soils or that reduce direct and indirect N_2O emissions from managed agricultural soils, as referred to in Section 1.1.1.1, points (a) and (c): at the same time as the activity period.

Operators or groups of operators may commit to a longer monitoring period at the time of submission of the initial or revised activity plan.

1.2.2. Rewetting and restoration of peatlands and of other organic soils

1.2.2.1. Activity period

The duration of the activity period shall be at least 10 years. Its maximum duration shall be either 30 years or the peat depletion time identified in the entire activity area in the absence of the activity, whichever is smaller. The activity period may be renewed up to the same overall maximum duration. The peat depletion rate shall be:

(a) 1.0 cm per annum on peatlands with acidic, nutrient-poor conditions primarily receiving water from precipitation, such as bogs;

(b) 1.5 cm per annum on nutrient-rich peatlands fed by ground water or surface water, such as fens.

These figures shall be increased in the case of peat erosion by water, wind or frost action and may be decreased where operators or groups of operators demonstrate with a scientific rationale that the rate is lower, e.g. in shallowly drained peatland or less nutrient-rich peatland in northern climate zones.

The determination of the relevant peat depletion rates shall be supported by reliable and verifiable information based on relevant datasets, or scientific literature pertaining to the activity area or comparable regions.

The activity area shall be stratified on the basis of comparable peat depths and peat depletion times before the beginning of the activity period.

Peat depth measurements shall be taken in a systematic or randomly stratified raster or transects with appropriate cover and spacing to allow for an adequate and comprehensive determination of the relevant peat depths over the entire activity area.

In the case of relevant surface height differences such as on former peat extraction sites, the selection of peat depth measurement points shall be guided by a high-resolution digital elevation model of the activity area.

Peat depth measurements shall be cored up to a depth of maximum 50 cm. The coring shall follow standard scientific protocols, and the method of choice shall be justified in the activity plan.

During the first five years of the activity, either the absence of a methane emission peak shall be plausible based on monitored vegetation and water table depth or 10 tons CO_2-equivalent per hectare shall be deducted each year from the net soil emission reduction benefit. For the cases referred to in Section 3.2.1, third paragraph, points (a) and (b), the plausibility of the absence of a methane peak or the deduction of 10 tons CO_2-equivalent per hectare are not required, where the activity started at least five years before the operator applied to a certification scheme or joined a group of operators, or at least five years before the recognition of the certification scheme under which the operator is certified.

1.2.2.2. Monitoring period

The monitoring period shall start and end at the same time as the activity period. In the event of renewals, the prolonged monitoring period shall end at the same time as the new activity period.

1.2.3. Afforestation

1.2.3.1. Activity period

The duration of the activity period shall be 35 years.

No renewal is allowed.

1.2.3.2. Monitoring period

The monitoring period shall start at the same time as the activity period and its duration shall be at least 40 years.

Operators or groups of operators may commit to a longer monitoring period at the time of submission of the initial or revised activity plan.

1.3. Planning and reporting

1.3.1. Activity plan

The activity plan shall include the following:

(a) general information:

(i) legal ownership and contact information;

(ii) georeferenced boundaries of the activity area, including, where applicable, codes from the national Integrated Administration and Control System or Land Parcel Identification System (LPIS), and planned size of the activity area;

(iii) duration of the activity period, including the start date;

(iv) the information referred in Article 8(1) of Commission Implementing Regulation (EU) 2025/2358[9];

(b) with regard to the eligibility requirements:

(i) description of intended practices;

(ii) evidence of previous land use, based on sources such as the LPIS, recent measurements or remote sensing data;

(c) with regard to the quantification criterion:

(i) the estimated baseline, including the assumptions used to calculate it, broken down by carbon removals, soil emissions and other GHG emissions associated to the activity;

(ii) the estimated carbon removals and/or soil emissions and other greenhouse gases to be generated by the activity, broken down by total carbon removals, total soil emissions, and other GHG emissions associated to the activity;

(d) with regard to the additionality criterion:

(i) regulatory test;

(ii) incentive effect test;

(iii) financial viability test;

(e) with regard to the storage, monitoring, and liability criterion:

(a) assessment of reversal risks;

(b) proposed practices to mitigate reversal risks;

(iii) chosen liability mechanism;

(f) with regard to the sustainability criterion:

(i) description of how the activity complies with the minimum sustainability requirements referred to in Section 5.1;

(ii) a description of how the activity complies with the obligation to generate co-benefits for the protection and restoration of biodiversity and ecosystems, including soil health and the avoidance of land degradation;

(iii) where applicable, other expected sustainability co-benefits;

(g) a monitoring plan as specified in Section 1.3.2.

[9] Commission Implementing Regulation (EU) 2025/2358 of 20 November 2025 laying down rules on certification schemes, certification bodies, and audits under Regulation (EU) 2024/3012 of the European Parliament and of the Council (OJ L, 2025/2358, 21.11.2025, ELI: http://data.europa.eu/eli/reg_impl/2025/2358/oj).

1.3.2. Monitoring plan

The monitoring plan shall consist of detailed, complete and transparent documentation about how operators or groups of operators plan to monitor the activity. Certification schemes may provide additional guidance specifying which elements shall be included for each type of activity, more frequent measurement requirements and/or more detailed requirements for quality assurance.

The monitoring plan shall include the following:

(a) a description of the carbon pools and emission sources applicable to the activity referred to in Tables 1 and 2 that will be used for quantification and, for each of them, the chosen quantification and monitoring approach and the frequency of monitoring;

(b) the relevant documentation listed in Sections 2.4.1.3, 2.4.2.3, 2.4.3.3 and 2.4.4.3;

(c) a description of how potential reversal events will be monitored and how reversals, should they occur, will be quantified throughout the monitoring period;

(d) a description of the approach to monitor other sustainability co-benefits referred to in Section 5.3, where applicable.

1.3.3. Revised activity plan

Operators or groups of operators shall submit to the certification body a revised activity plan in the following cases:

(a) changes to any of the elements listed in Sections 1.3.1 and 1.3.2, that justify the need to re-confirm compliance of the activity with the applicable methodology; and/or

(b) renewal of the activity.

Other changes shall be described only in the monitoring report.

In the event of point (b) above, the revised activity plan shall include at least updated information on the following:

(a) start date as referred to in Section 1.3.1, point (a)(iii);

(b) the estimated baseline and the estimated carbon removals and/or soil emissions and other greenhouse gases to be generated by the activity during the new activity period, as referred to in Section 1.3.1, point (c), based on updated assumptions and parameters;

(c) financial viability test as referred to in Section 1.3.1, point (d)(iii), considering costs and revenues occurring throughout the prolonged monitoring period;

(d) risk assessment as referred to in Section 1.3.1, point (e)(i).

The revised activity plan shall describe the nature, the rationale and impacts of the changes.

1.3.4. Monitoring report

Before every re-certification audit, operators or groups of operators shall submit to the certification body a monitoring report including the information specified in Section 1.3.4.1.

Before every monitoring audit, operators or groups of operators shall submit to the certification body a monitoring report including the information specified in Section 1.3.4.2.

Operators or groups of operators shall obtain, record, compile, analyse, document and archive monitoring data, including assumptions, references, activity data and calculation factors in a

transparent manner that enables the checking of performance achieved during the certification period, when requested, and report this information to the certification bodies or certification schemes.

Certification schemes shall provide additional guidance on late or incomplete submissions of the monitoring report or on additional documents to be submitted for the purposes of re-certification and monitoring audits.

Certification schemes shall allow for the sharing of monitoring data in an anonymised way with the Commission upon request by competent national authorities or the Commission.

1.3.4.1. Monitoring report before re-certification audits

For the purposes of the re-certification audits, the monitoring report shall include:

(a) the information listed in Table 1 and Table 2, where relevant;

Table 1

LULUCF carbon pools and LULUCF emission sources	GHG	Data unit	Description	Applicable to
Living biomass	CO_2	tonnes CO_2eq	Amount of total net removals	Agriculture and agroforestry on mineral soils, afforestation
			Amount of total net emissions	Rewetting and restoration of peatlands and of other organic soils
Mineral soils	CO_2	tonnes CO_2eq	Amount of total net removals	Agriculture and agroforestry on mineral soils, afforestation
			Amount of total net emissions	Agriculture and agroforestry on mineral soils, Rewetting and restoration of peatlands and of other organic soils, afforestation
Organic soils	CO_2, CH_4, N_2O	tonnes CO_2eq	Amount of total net emissions	Rewetting and restoration of peatlands and of other organic soils
Direct and indirect N_2O emissions from managed non-agricultural soils	N_2O	tonnes CO_2eq	Amount of total net emissions	Rewetting and restoration of peatlands and of other organic soils, afforestation

Table 2

Non-LULUCF emission sources	GHG	Data unit	Description	Applicable to
Managed agricultural soils	N_2O	tonnes CO_2eq	Amount of total emissions	Agriculture and agroforestry on mineral soils
Liming application	CO_2	tonnes CO_2eq	Amount of total emissions	Agriculture and agroforestry on mineral soils, rewetting and

				restoration of peatlands and of other organic soils
Urea application	CO_2,	tonnes CO_2eq	Amount of total emissions	Agriculture and agroforestry on mineral soils, rewetting and restoration of peatlands and of other organic soils
Fuel combustion	CO_2, CH_4, N_2O	tonnes CO_2eq	Amount of total emissions	Agriculture and agroforestry on mineral soils, rewetting and restoration of peatlands and of other organic soils, afforestation

(b) information about the use of the relevant quantification and monitoring approaches laid down in Sections 2.4.1.2, 2.4.2.2, 2.4.3.2 and 2.4.4.2, and their estimated uncertainties;

(c) information to verify compliance with the additionality tests laid down in Section 3;

(d) demonstration that no reversal has occurred or information about any occurred reversal, referred to in Section 1.3.4.2, second paragraph;

(e) information to verify compliance with the relevant sustainability requirements laid down in Section 5.

For the purposes of the demonstration referred to in point (d), for afforestation and agro-forestry operators may use aerial or space-borne ortho-imagery; for agricultural mineral soils, the absence of an avoidable reversal shall be demonstrated through evidence of continuation of the activity.

The monitoring report shall include the information referred to in points (c) and (e) only every five years.

1.3.4.2. Monitoring report before monitoring audits

For the purposes of the monitoring audits, operators or groups of operators shall submit the monitoring report at least every five years and within one year of becoming aware of an event resulting in a reversal, including either the demonstration that no reversal has occurred or information about any occurred reversal.

If a reversal has occurred, the monitoring report shall:

(a) include a description of the monitoring approach used;

(b) identify the location of the event in a geospatial vector format, such as shapefile, Keyhole Markup Language or similar formats, as one or more polygons, or by specifying the coordinates of the geographic boundary using a standard coordinate system, such as ETRS89 or WGS84;

(c) include a description and relevant data related to the observed reversal event and classify the event as being avoidable or unavoidable;

(d) quantify the amount of the reversal by using the quantification rules laid down in Section 2 or, where this is not possible due to the nature of the reversal event, produce a conservative estimate of the reversal and evidence why the estimate is conservative;

(e) describe the measures undertaken to stop the reversal and to prevent or minimise similar events occurring in the future.

2. QUANTIFICATION OF BASELINE, TOTAL CARBON REMOVALS, LULUCF SOIL EMISSIONS, $GHG_{ASSOCIATED}$, AND UNCERTAINTY DEDUCTION FACTOR

2.1. Scope

The temporary net carbon removal benefit and the net soil emission reduction benefit shall be quantified in accordance with equations (1) and (2).

$$\text{Temporary net carbon removal benefit} = \left(CR_{baseline} - CR_{activity}\right) \times (1 - UNC) - GHG_{associated} \quad \text{equation (1)}$$

$$\text{Net soil emission reduction benefit} = (LSE_{baseline} - LSE_{activity} + ASE_{baseline} - ASE_{activity}) \times (1 - UNC) - GHG_{associated} \quad \text{equation (2)}$$

Where:

(subscript) *baseline* = the quantity corresponding to the absence of the activity ('baseline scenario')

(subscript) *activity* = the quantity corresponding to the implementation of the activity ('activity scenario')

UNC = the factor representing the uncertainty at the level of the group of operators which shall be deducted to obtain a conservative estimate of total carbon removals or emission reductions ('uncertainty deduction factor').

Where, in a certification period, the result of equation (1) or (2) is negative despite an increase in carbon removals or a reduction in soil emissions, that negative benefit shall be recorded as a crediting deficit and be subtracted from equation (1) or (2) in the following certification period.

Table 3 shows the correspondence between the terms of equations (1) and (2) and the LULUCF carbon pools and GHG emission sources defined in the 2006 IPCC Guidelines.

Table 3

Term	**IPCC carbon pool or GHG emission source**	**GHG**
CR (net carbon removals)	Living biomass	CO_2
	Soil Organic Carbon (SOC) in mineral soils	CO_2
LSE (net LULUCF Soil Emissions)	Soil Organic Carbon (SOC) in mineral soils	CO_2, N_2O
	Soil Organic Carbon (SOC) in organic soils	CO_2, CH_4, N_2O
ASE (Agriculture Soil Emissions)	Direct and indirect N_2O emissions from managed agricultural soils	N_2O
$GHG_{associated}$	Living biomass in trees and shrubs (stems, branches and roots)	CO_2

	Direct and indirect N_2O emissions from managed agricultural soils	N_2O
	Liming & urea application	CO_2
	Fuel combustion	CO_2, CH_4, N_2O

If direct and indirect emissions of nitrous oxide (N_2O) from managed agricultural soils[10] are lower than in the baseline scenario, those emissions shall be accounted in equation (2) under the term ASE. If they are higher than in the baseline scenario, those emissions shall be accounted in equations (1) or (2) as $GHG_{associated}$.

Changes in soil carbon stock (CR in mineral soils), in mineral and organic soil emissions (LSE) and in N_2O emissions (ASE) shall be quantified separately for each stratum of land and summed up across all strata of land, to obtain the total carbon stock change and changes in soil emissions in the activity area. In addition, changes in soil carbon stock or in soil emissions may be quantified for other areas under the operational control of the operator.

Where in the context of afforestation activities operators apply tillage on permanent grassland, 12% loss[11] of existing soil carbon stocks, based on soil samples or on the relevant default reference condition for SOC stocks for mineral soils under the 2019 refinement to 2006 IPCC Guidelines[12], shall be deducted from the temporary net carbon removal benefit corresponding to the certification period during which tillage occurs.

Where agriculture and agroforestry activities on mineral soils generate both carbon removals and soil emission reductions, the $GHG_{associated}$ shall be subtracted from both the temporary net carbon removal benefit and the net soil emission reduction benefit after application of a weighting factor. The weighting factor shall correspond to the relative sizes of the temporary gross carbon removal benefit and the gross soil emission reduction benefit, where 'gross' means before subtraction of the $GHG_{associated}$.

Where CO_2 emissions from organic soils are reported, the estimate shall include off-site emissions such as Particulate Organic Carbon, Dissolved Organic Carbon, and Dissolved Inorganic Carbon.

2.1.1. Agriculture and agroforestry on mineral soils

The scope of the certification methodology for agriculture and agroforestry on mineral soils covers:

(a) carbon removals in mineral soils and, in the event of agroforestry practices, in living biomass;

(b) LULUCF soil emissions in mineral soils;

(c) agriculture soil emissions from managed agricultural soils;

(d) $GHG_{associated,}$ specifically an increase in:

[10] These emissions are reported in the GHG inventories under the *Agriculture* category following 2006 IPCC Guidelines. Indirect N2O emissions are emissions resulting from atmospheric deposition and nitrogen leaching and run-off.

[11] Based on the relative stock change factors for grassland management in Chapter 6, volume 4, Table 6.2 of the 2019 IPCC guidelines. Table 6.2 indicates that moving from improved grassland to nominal managed soils entails a carbon loss from 1.14 to 1, which is a loss of -12%.

[12] SOCref for mineral soils in Volume 4, Chapter 2, Table 2.3.

(i) direct and indirect N_2O emissions from managed agricultural soils;

(ii) CO_2 emissions from liming or urea application;

(iii) fuel combustion emissions from field operations or transport to the activity area,

compared to the same type of emissions in the baseline scenario as referred in Section 2.3.1.

2.1.2. Rewetting and restoration of peatlands and of other organic soils

The scope of the certification methodology for rewetting and restoration of peatlands and of other organic soils covers:

(a) LULUCF soil emissions in organic soils;

(b) agriculture soil emissions from managed agricultural soils, if applicable (optional);

(c) $GHG_{associated}$, specifically an increase in:

(i) CO_2 emissions from living biomass, if applicable;

(ii) direct and indirect N_2O emissions from managed agricultural soils;

(iii) CO_2 emissions from liming or urea application, if applicable;

(iv) fuel combustion emissions from field operations or transport to the activity area,

compared to the same type of emissions in the baseline scenario as referred in Section 2.3.1.

2.1.3. Afforestation

The scope of the certification methodology for afforestation covers:

(a) carbon removals in living biomass and, optionally, in mineral soils;

(b) LULUCF soil emissions from mineral and organic soils (optional);

(c) agriculture soil emissions from managed agricultural soils (optional);

(d) $GHG_{associated}$, specifically an increase in:

(i) direct and indirect N_2O emissions from soils related to the application of fertilisers on the newly planted trees;

(ii) fuel combustion emissions from field operations or transport to the activity area,

compared to a baseline equal to zero.

2.2. Quantification formulas

For the calculation of carbon removals, of LSE in mineral soils and, in the case of rewetting of peatlands and of other organic soils, of $GHG_{associated}$ from living biomass, the change in carbon stock in the baseline scenario and in the activity scenario during each certification period shall be calculated in accordance with equation (3):

$change\ in\ carbon\ stock = C_{y=t+x} - C_{y=t}$	equation (3)

Where:

y =	year (y=0 is the year when the activity period starts)
t =	year in which a certification period starts
x =	length of the certification period (in years or months)
$C_{y=t}$ =	carbon stock at the start of the activity period (if t=0) or at the start of each certification period (if t ≥ 1) (in tonnes C)
$C_{y=t+x}$ =	carbon stock at the end of each certification period (in tonnes C)

The change in carbon stock shall be multiplied by –44/12 to convert carbon into CO_2. Where the carbon stock increases, this results in CR, which is a negative number. Where the carbon stock decreases, this results in LSE or $GHG_{associated,}$ which are positive numbers.

LSE in organic soils, ASE, and $GHG_{associated}$ (except those from living biomass), shall be calculated by adding together the yearly emissions of the relevant GHG in the baseline scenario and in the activity scenario during each certification period, in accordance with equation (4):

$$emissions = \sum_{y=t}^{y=t+x} E_y$$	equation (4)

Where:

y =	year (y=0 is the year when the activity period starts)
t =	year in which a certification period starts
x =	length of the certification period (in years or months)
E_y =	emissions (LSE, ASE, or $GHG_{associated}$) in year *y* (in tonnes of CO_2 equivalent)

For the conversion of GHG emissions to CO_2 equivalent, the global warming potentials included in Commission Delegated Regulation (EU) 2020/1044[13] or in the latest IPCC Assessment Report[14] shall be used.

[13] Commission Delegated Regulation (EU) 2020/1044 of 8 May 2020 supplementing Regulation (EU) 2018/1999 of the European Parliament and of the Council with regard to values for global warming potentials and the inventory guidelines and with regard to the Union inventory system and repealing Commission Delegated Regulation (EU) No 666/2014 (OJ L 230, 17.7.2020, p. 1, ELI: http://data.europa.eu/eli/reg_del/2020/1044/oj).

[14] Sixth Assessment Report (AR6) of the IPCC 2021 Forster, P., T. Storelvmo, K. Armour, W. Collins, J. L. Dufresne, D. Frame, D. J. Lunt, T. Mauritsen, M. D. Palmer, M. Watanabe, M. Wild, H. Zhang, 2021, The Earth's Energy Budget, Climate Feedbacks, and Climate Sensitivity. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. In Press. - https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter_07.pdf

2.3. Baselines

2.3.1. Baseline for soils

An activity-specific baseline shall apply to CR in mineral soils, LSE and ASE.

The baseline scenario shall reflect the continuation of the soil or crop management carried out during a reference period considering, where applicable, crop rotation cycles. The reference period shall consist of at least three years immediately prior to the start of the activity period; in the event of renewals, the reference period prior to the start of the first activity period shall be used. The length of the reference period shall be extended, where applicable, to the length of the relevant crop rotation cycle.

Where the model approach described in Section 2.4.1 is used, the projected activity-specific baseline included in the activity plan, where appropriate, shall be adjusted at each re-certification audit to take into account the impacts of actual weather conditions that have occurred during the previous certification period.

Where the measurement approach described in Section 2.4.2 is used, the baseline shall be measured in control plots where the same management as in the reference period is carried out, or a baseline equal to zero shall apply.

2.3.2. Baseline for living biomass

A baseline equal to zero shall apply to CR in living biomass in trees, woody elements, or orchards resulting from planting, seeding, or natural regeneration activities. In case trees, woody elements, or orchards were present on the activity area prior to the time of submission of the activity plan to the certification body, the growth in carbon stock from such pre-existing vegetation shall not be included in the quantification of the temporary net carbon removal benefit.

2.3.3. Update of the baseline

For the practices referred to in Section 1.1.1.1, point (c), the ambition of $ASE_{baseline}$ shall be increased every five years by applying a downward adjustment. Such adjustment shall correspond to 1 % of the initial baseline for every year that has passed since the start of the first activity period.

2.4. Quantification and monitoring approaches

One or more of the following approaches shall be used to quantify and monitor the temporary net carbon removal benefit and the net soil emission reduction benefit:

(a) approach 1: models

(b) approach 2: measurements

(c) approach 3: proxies

(d) approach 4: default emission factors

Table 4 lists the possible approaches to quantify and monitor each term of the temporary net carbon removal benefit and of the net soil emission reduction benefit:

Table 4

IPCC carbon pool or GHG emission source	**Approach(es)**
Living biomass	1, 2

Soil Organic Carbon in mineral soils	1, 2
Soil Organic Carbon in organic soils	1, 3
Direct and indirect N_2O emissions from managed agricultural soils	1, 4
Liming & urea application	1, 4
Fuel combustion	4

Where multiple approaches are applicable, only one of them shall be chosen to quantify or monitor the same term in a consistent way throughout the monitoring period.

The same approach shall be used for the calculation of the same term in the activity and in the baseline scenarios.

For groups of operators, quantification and monitoring shall be performed at the level of the group.

2.4.1. Approach 1: models

2.4.1.1. Eligible models

Eligible models shall cover:

(a) process-based models, that is, computational frameworks that simulate biological, chemical, and physical processes governing GHG fluxes, such as biogeochemical models, soil carbon models, ecosystem process models, hydrological models and dynamic vegetation models;

(b) statistical and probabilistic models, that employ statistical techniques to relate observed environmental variables (including management practices) and/or remote sensing data (satellite, LiDAR, high resolution imagery) to carbon stock changes and GHG fluxes. Examples include machine and deep learning models, regression models, geospatial analysis models.

The selected model shall be a model that the Commission has considered compliant with the following criteria:

(a) transparency and traceability, that is to say, the attributes of the model shall be well described, the model version shall be clearly indicated and changes between versions shall be traceable and well documented;

(b) scientific credibility, that is to say, the model shall have been shown in peer-reviewed scientific literature to estimate carbon stock changes and/or GHG emissions for soil/crop management, fertiliser management, rewetting and restoration of peatlands and of other organic soils, or agroforestry/afforestation under comparable pedo-climatic conditions and for the plant functional types or vegetation characteristics that are relevant to the activity;

(c) suitability, that is to say, the model shall have been calibrated and validated based on direct measurements of GHG fluxes or carbon stock changes from datasets that accurately represent the pedo-climatic region where the activity takes place, while the calibration and validation data shall be independent, either by using two separate datasets with no overlap of research locations, or by employing a statistical process such as cross-validation;

(d) minimum accuracy, that is to say, when tested against the validation dataset, the mean bias of the model, as expressed in equation (5), shall be smaller than or equal to an estimate of pooled measurement uncertainty (PMU), as expressed in equation (6); at least 90 % of the observed values shall fall within the model's 90 % prediction intervals, and the amount of variance explained by the model (R^2), as expressed in equation (7), shall be greater than zero.

$$mean\ bias = \sum_{i=1}^{n} (P_i - O_i)/n$$	equation (5)

Where:

P_i = predicted change in carbon stock or GHG emission

O_i = observed change in carbon stock or GHG emission

i = index of observation within study

n = number of observations for a given study

$$PMU = \sqrt{\frac{\sum_{j=1}^{k} \sigma_j^2 (n_j - 1)}{\sum_{j=1}^{k} (n_j - 1)}}$$	equation (6)

Where:

k = number of observations across all studies

σ_j = standard error of the j^{th} observed change in carbon stock or GHG emission

n_j = number of replicate measurements used in the j^{th} observation

$$R^2 = 1 - \frac{\sum_{i=1}^{n} (P_i - O_i)^2}{\sum_{i=1}^{n} (O_i - \bar{O})^2}$$	equation (7)

Where:

P_i = predicted change in carbon stock or GHG emission

O_i = observed change in carbon stock or GHG emission for observation i

$\bar{O}$ = mean of observed values of change in carbon stock or GHG emission

i = index of observation within study

n = number of observations in the validation set

2.4.1.2. Use of models

Where a model is used to estimate changes in SOC stocks, measured soil data shall be used for model initialisation and model verification[15].

For model initialisation, initial SOC shall be determined based on either validated regional or national SOC stock maps or on soil samples taken in accordance with the sampling and laboratory rules referred to in Section 2.4.2.2, covering the main strata and located within the activity area. As a general rule, soil samples shall be taken within 18 months before or after the start of the activity period; alternatively, relevant SOC stock information from soil samples taken in the 5 years prior to the start of the activity period may be used.

For model verification, soil samples shall be taken within 18 months before or after the start of the activity period and at least every five years afterwards. The number of soil samples shall be chosen as to achieve the targeted uncertainty level; alternatively, where process-based models are used, the number of soil samples may be equal to 20% of the result of Equation (8). The initial sampling points shall be resampled at the same locations, using the same sampling and lab analysis approach. Alternatively, available soil sampling data from regional or national monitoring networks may be used for model verification purposes provided that such regional or national monitoring networks include data on crop and soil management and are based on soil samples taken with at least the same sampling density and temporal resolution, covering similar land management practices, and located within the region of the activity area. The median value of the SOC stock changes simulated by the model shall be within the 90% confidence interval of the changes in measured SOC stocks used for model verification. The results of the model verification shall be taken into account to quantify the uncertainty of the model for future certification periods.

Where a model is used to estimate changes in carbon stock in living biomass based on remote sensing data, the model shall take into account the most prominent site-specific variables pertinent to the activity, including land cover, volume of above-ground biomass, volume of below-ground biomass, local climate conditions, soil type, management type and intensity, and digital elevation model. The minimum resolution of remote sensing data for land cover and volume of above-ground biomass shall be 10 m. The processing of raw data from remote sensing shall include local calibration supported by the use of measurements incorporated in the final calculation of the confidence intervals for the estimates of total carbon removals or soils emission reductions.

2.4.1.3. Information to be included in the monitoring plan

The monitoring plan shall include a description of the procedures that were followed to apply the model, covering at least:

(a) conformity of the use of the model with the domain of application;

(b) a description of the type and source of input data and potential pre-processing of the data;

(c) the system boundaries (spatial, temporal, soil depth, etc.);

(d) the sampling design used for verification purposes, including the information listed in section 2.4.2.3, and the level of performance expected from the model;

[15] Model verification shall be conducted at the level of a group of operators using the same model within similar pedoclimatic conditions.

(e) a description of the approach taken to estimate uncertainty in the model outputs, including the resulting model prediction error;

(f) information on the quality assurance and quality control steps;

(g) the responsibility for data collection and archiving.

2.4.2. Approach 2: measurements

2.4.2.1. Eligible measurements

Eligible measurements shall cover:

(a) direct measurements of SOC through soil sampling techniques;

(b) allometric equations, biomass expansion factors (BEFs) or biomass conversion and expansion factors (BCEFs) that indirectly measure biomass by correlating direct measurements of forest structure, such as tree diameter and tree height, with biomass or carbon;

(c) indirect measurements through on-site proximal sensing techniques, that is, field-based sensors that are in contact with, or within 2 m of the soil and that detect signals from the soil.

Allometric equations, BEFs or BCEFs, including parameters used to derive them like wood-specific gravity or wood density, carbon fractions and root-to-shoot ratios, referred to in the first paragraph, point (b), shall be either of the following:

(a) site-specific, that is, developed by harvesting a representative sample of similar trees on a site close to the activity area and directly measuring their volumes and dry biomass;

(b) published in peer-reviewed scientific literature based on research carried out in the location or region of the activity or for similar forest type and climate and edaphic conditions; or

(c) applied in regional or national forest inventories, or in the national GHG inventories for LULUCF.

In addition, they shall be selected in accordance with all the following criteria:

(a) taxonomic hierarchy validation: the choice of the equation shall fit the species being measured and minimise bias introduced by phylogenetic differences in tree architecture and wood properties, and follow the following priority order:

  (a) species-specific equations developed for the planted or inventoried species;

  (b) genera-specific equations;

  (c) equations derived from closely related families or functional groups;

  (d) broadleaved or coniferous generalised equations, subject to justification of applicability across a wide functional group;

(b) size and stand structure validation: the distribution of tree sizes (stand structure) in the inventory plot shall align with the range utilised for the equation’s original development;

(c) climatic and edaphic validation: the climatic and edaphic conditions of the activity area shall fall within the range of conditions under which the selected equation was originally developed.

Proximal sensing techniques referred to in the first paragraph, point (c), shall be techniques that the Commission has considered compliant with the following criteria:

(a) transparency, that is to say, the functions and parameters underlying the proximal sensing technique shall be well described;

(b) scientific credibility, that is to say, the proximal sensing technique shall have been shown in peer-reviewed scientific literature to detect differences in soil or biomass carbon stocks across different pedo-climatic conditions or management practices, and, if used to measure soil carbon, to specifically measure soil carbon without significant interference from other soil properties;

(c) suitability, as described in Section 2.4.1.1., second paragraph, point (c);

(d) minimum accuracy, as described in Section 2.4.1.1., second paragraph, point (d).

2.4.2.2. Use of measurements

A. Rules applying to the approaches referred to in Section 2.4.2.1., first paragraph, points (a) and (c)

Sampling design for mineral soils may be based on stratified random sampling of the activity area using a model-based approach or a design-based approach. Sampling design and strata shall remain the same between measurement and remeasurement. Sample size shall be calculated ex ante using confidence interval or hypothesis testing methods; it shall be large enough to quantify changes at the lower bound of the one-tailed confidence interval with minimum confidence level of 70 % and to mitigate the risk of losing field sampling locations over time. The minimum number of samples shall be calculated in accordance with equation (8):

$n \geq \sigma^2 \frac{{z_\alpha}^2}{E^2}$	equation (8)

Where:

n = expected minimum number of samples

σ^2 = expected variance of SOC stocks based on existing local datasets, or SOC stock changes if those data are available

z_α = critical value of the standard normal distribution at the significance level α (α = 100 % - confidence level), with a z-value of 0,52 for a one-sided 70 % confidence level

E = tolerable error (e.g. expected effect size multiplied by the confidence level or the minimum detectable difference)

Field sampling locations shall be determined from the sampling design and sample size. The coordinates of these field sampling locations shall be recorded to support resampling at the same locations.

Individual or composite sampling of soils at field sampling locations may be carried out, in accordance with the required sample size and sampling design.

Soil sampling shall be representative of the 0-30 cm layer or, in the case of shallower topsoil, of the layer going from the surface (0 cm) to the bedrock. Actual soil depths sampled shall be recorded and used in SOC stock calculations.

Soil samples shall be taken within one year before or after the start of the activity period. Soil sampling shall be carried out within the same season, at least six weeks after the last organic fertilisation event and, where possible, under the same soil and tillage conditions at measurement and remeasurement.

The same type of equipment shall be used for measurement and remeasurement.
Alternatively, the methodology set out in Annex V to Commission Implementing Regulation (EU) 2022/996[16] may be applied.

B. Rules applying to the approach referred to in Section 2.4.2.1, first paragraph, point (a)

Laboratory determination of SOC stocks shall be based on equation (9):

$SOC_{stock} = OC_{\%} \times BD_{fe} \times depth \times (1 - G_v)$	equation (9)

where:

$OC_{\%}$ = organic carbon content in the fine earth fraction (%, < 2 mm)

BD_{fe} = bulk density of the fine earth fraction (g cm^{-3})

depth = depth of the respective soil layer (cm) from field sampling

Gv = volumetric coarse fragment (> 2 mm) content (a default density value of 2,6 g/cm^3 may be used to convert mass into volume)

$OC_{\%}$ may be determined using dry combustion with elemental analysis (EN ISO 15936), temperature dependent differentiation of total carbon (EN 17505:2023), near-infrared spectrometry (EN ISO 17184:2014) or alternative methods for which an ISO standard or a formal accreditation in a Member State is available. Inorganic carbon shall be excluded.

BD_{fe} shall be determined using either a laboratory determination following ISO EN 11272:2017, with the addition of documented steps to determine BD_{fe} from the fine earth fraction; or alternative methods for which ISO standards or a formal accreditation in a Member State are available; or a validated pedo-transfer function. Such a pedo-transfer function shall be representative of the pedo-climatic conditions, based on data from at least 300 direct measurements and have an R^2 of at least 0,6 and no bias (less than 5%).

Where relevant, models and model parameters shall be clearly described and justified. For all methods, analytical error shall be reported.

For remeasurement, the same BD_{fe} and G_v values used for the initial SOC stock may be used to calculate the SOC stock at the subsequent re-certification audits. Where the BD_{fe} is measured again, the SOC stock changes shall be calculated based on the equivalent soil mass (ESM) method as described in the UN Food and Agriculture Organization Guidelines (2019)[17] or other ESM methods, where justified. Errors associated with ESM methods shall be

[16] Commission Implementing Regulation (EU) 2022/996 of 14 June 2022 on rules to verify sustainability and greenhouse gas emissions saving criteria and low indirect land-use change-risk criteria (OJ L 168, 27.6.2022, p. 1, ELI: http://data.europa.eu/eli/reg_impl/2022/996/oj).

[17] Food and Agriculture Organization of the United Nations, Measuring and modelling soil carbon stocks and stock changes in livestock production systems, Guidelines for assessment, 2019.

accounted for with error propagation. ESM methods and calculations shall be documented. ESM is not required where soils are sampled to a depth of at least 60 cm or to bedrock.

Laboratory methods shall remain the same and demonstrate consistency for measurement and remeasurement. Laboratories used for soil analysis shall be in conformity with ISO/IEC 17025:2017 and make available quality control data (e.g. interlaboratory trials, use of reference materials, calibration methods) for the determination of analytical uncertainty and audit purposes.

C. Rules applying to the approach referred to in Section 2.4.2.1, first paragraph, point (b)

Sampling design for agroforestry shall follow a census-based approach: at the start of the activity period, a count of planting units (single trees, lines of trees, meter of hedges, small copses) shall be performed. The number of planting units shall be used for scaling of carbon stocks. At subsequent re-certification audits, a representative sample of the planting units shall be used. Biomass of trees and hedges shall be estimated for each parcel and for parcel boundaries. Field sampling locations for trees or hedges shall be distributed randomly across the activity area.

Sampling design for afforestation shall follow an area-based approach: plot-based sampling methods shall be used to scale biomass and resulting carbon stock estimates per unit area, using the activity area as the multiplier. Sample plots shall provide a representative sample and be distributed randomly in all strata identified across the activity area. The number of plots shall be selected depending on the variability of the activity area and the accepted margin of error.

For agroforestry and afforestation, field sampling locations shall be determined from the sampling design and sample size. The coordinates of these field sampling locations shall be recorded to support resampling at the same locations. Tree sizes like diameter and height shall be measured and converted to biomass and carbon using appropriate allometric equations and/or BEFs/BCEFs as referred to in Section 2.4.2.1. Information on species and size of individual trees shall be recorded together with the applied allometric equations or BEFs/BCEFs.

For agroforestry, the number of planting units to be sampled shall be selected depending on species and diameter classes of the trees, the biophysical circumstances in the activity area, the desired confidence interval and the accepted margin of error. The minimum number of planting units to be sampled shall be calculated using equation (10):

$n \geq \sigma^2 \frac{{z_\alpha}^2}{E^2}$	equation (10)

Where:

n = expected minimum number of sampling units

σ^2 = expected variance of biomass based on existing local datasets or new measurements

z_α = critical value of the standard normal distribution at the desired significance level α (α = 100 % - confidence level), with a z-value of 1,65 for a 90 % confidence level.

E = tolerable error (e.g. expected effect size multiplied by the confidence level)

For afforestation, the number of plots that shall be sampled per stratum may be calculated using the relevant clean development mechanism afforestation and reforestation (CDM A/R) Methodological Tool[18] or available tools adopted under the Paris Agreement Crediting Mechanism.

2.4.2.3. Information to be included in the monitoring plan

Where the approaches referred to in Section 2.4.2.1, first paragraph, point (a), point (b) with site-specific allometric equations and BEFs/BCEFs, or point (c), are used, the monitoring plan shall include:

(a) a description of the sampling design, clearly describing, if applicable, methods and models used, including model parameters;

(b) a demonstration that the sample size is appropriate for the sampling design deployed and sufficient to measure expected carbon stock changes for the activity area over the certification period, based on relevant scientific literature;

(c) the minimum relevant effect/difference, that is, the expected carbon stock change over the certification period that shall be detected by the sampling design;

(d) prior information on the population variance of the target variable, that is, the expected variability in carbon stock changes for the activity area;

(e) a description and justification of the process for selecting sample sites, field procedures to collect measurements, measurement equipment and methods, and processes for dealing with exclusions and replacements;

(f) a sample collection and relevant quality assurance and quality control protocols;

(g) a description of the resampling strategy and reasoning for the adopted resampling frequency;

(h) data processing and quality assurance and quality control protocols including how the adopted resampling frequency is handled when estimating carbon stock changes and their associated uncertainty.

Where the allometric equations, BEFs or BCEFs referred to in Section 2.4.2.1, first paragraph, point (b), are taken from peer-reviewed scientific literature, regional or national forest inventories, or the national GHG inventories for LULUCF, the monitoring plan shall include the information referred to in Section 2.4.1.3.

2.4.3. Approach 3: proxies

2.4.3.1. Eligible models based on proxies

Eligible models shall:

(a) apply to peatlands and other organic soils;

(b) use vegetation types, water table depth, or land use as proxies, whereby vegetation shall be preferred and land use may be used as main proxy only in the absence of vegetation cover;

[18] UNFCCC/CCNUCC A/R Methodological Tool Calculation of the number of sample plots for measurements within A/R CDM project activities (Version 02.1.0).

(c) correlate site proxy variables (such as water table depth or vegetation types) to GHG fluxes using statistical regression or multivariate analysis;

(d) be based on a meta-analysis of published data including at least CO_2 and CH_4 emissions;

(e) where vegetation is used as a proxy, distinguish vegetation types on the basis of plant species or species groups that are indicative of water table depth or the proportion of shunt species in the vegetation.

Where a vegetation type in the activity area does not have sufficient similarity with the vegetation types used in the model, regression models between the mean annual water table depth and GHG fluxes from the same region of the activity area may be used to determine the emission factors.

The models referred to in the first paragraph shall be models that the Commission has considered compliant with the following criteria:

(a) transparency, that is to say, the functions and parameters underlying the model shall be well described and the proxy-specific emission factors shall be publicly accessible;

(b) scientific credibility, that is to say, the model shall have been shown in peer-reviewed scientific literature to detect differences in GHG fluxes for the relevant pedo-climatic conditions and management practices;

(c) suitability, that is to say, the model shall have been calibrated and validated based on direct measurements of GHG fluxes that accurately represent the pedo-climatic region where the activity takes place, while the calibration and validation data shall be independent, either by using two separate datasets with no overlap of research locations, or by employing a statistical process such as cross-validation;

(d) representativity and reliability, that is to say, the model shall be based on year-round GHG measurements on at least 100 sites, representative of at least 10 different combinations of water table depths and vegetation, where feasible, in the region of the activity area. Where no model is available for the pedo-climatic region where the activity takes place, a model of another region with similar peatland/organic soil types, vegetation types, and climatic conditions may be used. In that case year-round GHG measurements on at least 10 sites, representative of at least 5 different combinations of water table depths and vegetation, where feasible, in the region where the activity takes place shall be used to extrapolate estimates using the model from that other region.

2.4.3.2. Use of proxies

The collection of proxy information shall be stratified in a way that adequately represents the relevant differences in relief, vegetation composition, vegetation structure, water table depth, and peat depth in the activity area. Such collection may use a grid, a geo-statistical approach, or wall-to-wall mapping, or a combination thereof. The coordinates of these field sampling locations shall be recorded to support resampling at the same locations.

Where vegetation is used as proxy, the activity area shall be mapped at least at 1:10,000 scale every 5 years.

Where water table depth is used as proxy, it shall be measured or modelled at least twice per month, where feasible.

Where vegetation types, water table depth classes and land use types are used as proxies, the emission factor shall be the mean of the respective measured annual emission values.

Where water table depth is used as proxy, the regression line correlating the value of the respective variables shall be used to calculate the emission factor.

2.4.3.3. Information to be included in the monitoring plan

The monitoring plan shall include:

(a) a description of the stratification, sampling and mapping design, including a description and justification of sample site selection, field procedures, equipment used, and procedures for dealing with exclusions and replacements;

(b) a demonstration that the stratification, sampling and mapping design are appropriate and sufficient to assess GHG fluxes for the activity area over the certification period, based on relevant scientific literature;

(c) the expected minimum relevant GHG flux change over the certification period that shall be detected by the stratification, sampling and mapping design;

(d) the expected variability in GHG fluxes for the activity area;

2.4.4. Approach 4: default emission factors

2.4.4.1. Eligible emission factors

Eligible emission factors shall cover:

(a) Tier 2 emission factors used in the national GHG inventory of the Member State where the activity takes place;

(b) where emission factors under point (a) are not available, Tier 1 emission factors included in the 2006 IPCC Guidelines[19] and any further refinement to those Guidelines.

2.4.4.2. Use of emission factors

Emission factors shall be multiplied by the relevant activity data.

2.4.4.3. Information to be included in the monitoring plan

The monitoring plan shall include:

(a) a justification of the selected emission factors;

(b) the source of the used emission factors;

(c) a description of the activity data.

2.5. Quantification of the uncertainty deduction factor

The uncertainty deduction factor shall be 8 % or equal to the estimated uncertainty, whichever is higher. To this end, the quantification of total carbon removals and soil emissions shall include an estimate of uncertainty by considering the model prediction error, reflecting both the parameter uncertainty and structural uncertainty, the measurement error of input data, and the sampling error related to the sampling design, as applicable. For soil and biomass carbon stock changes, the quantification of uncertainty may be cumulative over several certification periods. Where relevant, spatial autocorrelation effects shall be taken into account in the aggregation of the calculated uncertainty over the entire activity area.

[19] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_11_Ch11_N2O&CO2.pdf

The model prediction error shall be quantified using either statistical validation based on ground-truth measurements or a Monte Carlo simulation. Where a frequentist statistical validation method is used, the model prediction error shall be expressed as the standard deviation of the difference between the modelled values and ground-truth measurements; when a Monte Carlo simulation is used, the model prediction error shall be expressed as the standard deviation of the probability distribution. The input data for Monte Carlo simulation shall be drawn from distributions described by the mean inputs of the measured parameters and their corresponding measurement error.

The measurement error shall correspond to the standard error of the mean and shall be obtained from:

(a) laboratories used for soil analysis, for mineral soils;

(b) default values in the 2006 IPCC Guidelines, statistical sampling methods or, where the former are not available, expert judgment, for organic soils;

(c) the 2006 IPCC Guidelines, for biomass;

(d) information from producers of measurement equipment.

For biomass, the sampling error shall correspond to the standard error of the mean and be calculated based on repeated sampling of some of the sampling locations. For mineral soils, the sampling error shall correspond to the standard error of the mean and be calculated based on repeated sampling of some of the sampling locations or on local information on SOC variability from existing sources. When using BEFs/BCEFs, uncertainty shall be propagated in the resulting carbon stock changes for living biomass in line with the 2006 IPCC Guidelines on combining uncertainties[20].

For SOC and biomass carbon stock changes, the uncertainty deduction factor (UNC) shall be computed in accordance with equation (11), where models are used, and in accordance with equation (12), where direct measurements are used:

$UNC = \left(\frac{SD_{\Delta x}}{\Delta x}\right) \times t_{ci}$	equation (11)
$UNC = \left(\frac{SE_{\Delta x}}{\Delta x}\right) \times t_{ci}$	equation (12)

Where:

$SD_{\Delta x}$ = standard deviation of the mean modelled carbon stock change of carbon pool x

$SE_{\Delta x}$ = standard error of the mean measured carbon stock change of carbon pool x

Δx = mean estimated stock change of carbon pool x

t_{ci} = t value for a one-sided student's t-distribution at confidence interval *ci*, which shall be equal to 70 % for SOC stock changes and 90 % for biomass

[20] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/1_Volume1/V1_3_Ch3_Uncertainties.pdf and https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/1_Volume1/19R_V1_Ch03_Uncertainties.pdf

carbon stock changes

For N_2O emissions from managed agricultural soils, the uncertainty deduction factor shall be determined in accordance with equation (13).

$UNC = \left(\frac{SD_{\Delta N2O}}{\Delta N2O}\right) \times t_{ci}$	equation (13)

Where:

$SD_{\Delta N2O}$ = standard deviation of the mean modelled N_2O soil emission reduction

$\Delta N2O$ = mean estimated N_2O soil emission reduction

t_{ci} = t value for a one-sided student's t-distribution at confidence interval *ci* which shall be equal to 70 %

When proxies are used to quantify and monitor CO2 and CH4 emissions from organic soils, a default uncertainty deduction factor equal to 10% shall apply.

When emission factors are used to quantify and monitor N_2O emissions from managed agricultural soils, the uncertainty deduction factor shall be 15%, where Tier 1 emission factors are used, or 10%, where Tier 2 emission factors are used.

3. ADDITIONALITY

3.1. Regulatory test

This test shall demonstrate that the net climate benefit resulting from the activity does not occur as a result of any legal requirement on the operator stemming from Union or national legislation to carry out the activity in the activity area, unless such legislation refers to or formally integrates certification under Regulation (EU) 2024/3012 as an instrument for implementation.

National legislation includes laws, statutes and regulations also at regional level, as well as court orders or other legally binding agreements.

Carbon removals or soil emission reductions resulting from activities that are required under national or Union obligations may be eligible for certification if they go beyond those requirements, but only the additional carbon removals or soil emission reductions may be included in the net carbon removal or soil emission reduction benefit.

3.2. Financial viability

3.2.1. Incentive effect test

This test shall demonstrate that certification has an incentive effect, that is that certification induces the operator to change its behaviour in order to engage in the additional activity, which it would not carry out without certification or would carry out in a restricted or different manner.

Certification presents an incentive for the operator wherever work on the relevant activity has not yet started at the time of submission of the application to the certification scheme or at the time of joining a group of operators. In this regard, start of works on the activity means the earlier of, either the start of the activity, or the first legally binding commitment to order equipment or employ services or any other commitment that makes the activity irreversible.

Preparatory works such as obtaining permits and conducting feasibility studies are not considered start of works on the activity.

By way of derogation from the first and second paragraphs, the incentive effect test is deemed to be complied with for:

(a) operators who started the activity before applying to a certification scheme or joining a group of operators, if the activity started between 1 January 2023 and 31 December 2027. In this case, for the quantification of the baseline, the reference period referred to in Section 2.3.1 shall consist of at least the three years immediately prior to the start of works on the relevant activity, and the quantification approach referred to in Section 2.3.1 may include trees and vegetation that were present on the activity area prior to the submission of the application to the certification scheme or to joining a group of operators, if they were planted or seeded between 1 January 2023 and 31 December 2027;

(b) operators who started the activity under a certification scheme before its recognition under Implementing Regulation (EU) 2025/2358. Only carbon removals or soil emission reductions generated after the adoption of the recognition decision shall be eligible for certification.

3.2.2. Financial viability tests

The financial viability tests shall demonstrate that the activity is not financially viable in the absence of revenues from certification by means of an investment analysis.

To that end, either the simple cost test or the investment comparison test may be used. The simple cost test may be used only where the activity does not generate any cost savings or revenues other than revenues from certification during the monitoring period.

3.2.2.1. *Simple cost test*

The simple cost test shall be conducted using the following steps:

(a) describing the costs associated with the financing of the activity over the monitoring period;

(b) demonstrating with appropriate evidence that, in the absence of certification, the activity would not generate cost savings or revenues during the monitoring period;

(c) documenting any public funding provided to the activity and demonstrating that public funding would not have filled the funding gap of the activity in the absence of the revenues from certification.

3.2.2.2. *Investment comparison test*

The investment comparison test shall compare the financial attractiveness of the activity with an alternative investment scenario.

The investment comparison test shall be conducted using the following steps:

(a) describing the costs associated with the financing of the activity and of the alternative scenario over the monitoring period;

(b) using the net present value (NPV) of the investment as indicator for assessing the financial viability of the activity and of the alternative scenario;

(c) calculating the financial viability of the activity and of the alternative scenario without revenues from the certification, using the NPV as calculated in accordance with equation (14), justifying the calculation with appropriate evidence;

$NPV = \sum \frac{P - L}{(1 + i)^t}$	equation (14)

Where:

P = expected revenues from the activity (without revenues from certification)

L = expected costs of the activity

i = estimated weighted average cost of capital or discount rate of 3,5 %[21]

t = monitoring period;

(d) applying Section 3.2.2.1, point (c);

(e) demonstrating that the activity without revenues from certification is not the most financially viable scenario, by comparing the NPV calculated for the activity and the alternative scenario.

3.2.2.3. *Common rules to simple cost and investment comparison tests*

The tests shall include all relevant costs, including capital expenditure (CAPEX), operational expenditure (OPEX) and opportunity costs, and all revenues and cost savings, including any public funding received. The tests may also include the costs associated with any barriers faced by the proposed activity where they can be monetised and quantified as additional costs.

The tests shall not include expenditures incurred prior to the start of the activity, save where such expenditures are directly linked to the activity and were committed prior to the start date, but payment is to be made after the start date.

All parameters and assumptions shall be internally consistent. The assumptions, data and conclusions shall be transparently documented and appropriately justified and substantiated by evidence.

The test shall be implemented in a conservative manner.

4. STORAGE, MONITORING AND LIABILITY

4.1. Risk assessment

Operators or groups of operators shall carry out a risk assessment for the activity before the start of the activity period. The risk rate resulting from the risk assessment of the activity shall account only for unavoidable events.

Reversals resulting from the management of the activity and any other wilful actions by the operator or from mismanagement, neglect or illegal actions by the operator, including as a consequence of insolvency, or reversals that have occurred following a failure to implement the risk mitigation measures that is attributable to the operator, shall be classified as avoidable.

Reversals resulting from natural events and extreme events, war or acts of terrorism, changes in policies or legal requirements that prevent the operator from implementing risk mitigation measures and reversals resulting from illegal action by third parties that may not be

[21] Based on Commission Implementing Regulation (EU) 2022/996 of 14 June 2022 on rules to verify sustainability and greenhouse gas emissions saving criteria and low indirect land-use change-risk criteria (OJ L 168, 27.6.2022, p. 11, ELI: http://data.europa.eu/eli/reg_impl/2022/996/oj).

controlled, influenced or managed using legal means by the operator shall be classified as unavoidable.

Reversals caused by any factors that were not identified in the risk assessment shall be classified as avoidable and may only be classified as unavoidable with due justification, such as in cases of clear *force majeure*. Early termination of an activity that generated carbon farming sequestration units shall be considered equal to a full avoidable reversal.

If, within the monitoring period, the total emissions from the release of stored carbon do not exceed the total carbon removals expected after the end of activity period, such emissions shall not qualify as reversal.

Operators or groups of operators shall update the risk assessment every five years and after any unavoidable event.

4.1.1. Agriculture on mineral soils

Operators or groups of operators shall calculate a risk rate for the activity, that shall be based on two indicators[22]:

(a) hazard, that is, the climatic conditions and land management that drive changes in SOC, and for which recent changes in SOC in the activity area shall be used as a proxy;

(b) vulnerability, that is, the characteristics of the soil that make it more prone to losing carbon in the case of hazard, and for which the level of carbon saturation in the activity area shall be used as a proxy.

For the purposes of the first paragraph, point (a), the changes in SOC in the activity area during the 10 years preceding the start of the activity period shall be estimated. To that end, operators or groups of operators may use own data, national survey data or the most recent estimate of SOC changes based on data made available by the Commission[23].

The hazard indicator shall be classified as follows:

(a) low, where SOC has increased or remained stable;

(b) high, where SOC has decreased.

For the purposes of the first paragraph, point (b), carbon saturation shall be calculated as the ratio between the average mineral-associated organic carbon (MAOC) content in the activity area and the maximum MAOC content in the pedo-environmental zone to which the activity area belongs, expressed as a percentage.

To that end, carbon saturation values made available by the Commission[24] may be used. Alternatively, operators or groups of operators may measure MAOC levels in the activity area as the organic carbon associated to the fine fraction of the soil (that is, silt and clay) that can be isolated by a size fractionation (<53 micro meter[25]) of the bulk soil[26], and divide it by the

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22 Breure, T.S., De Rosa, D., Panagos, P., Cotrufo, M.F., Jones, A. and Lugato, E., 2025. Revisiting the soil carbon saturation concept to inform a risk index in European agricultural soils. *Nature Communications*, *16*(1), p.2538. https://doi.org/10.1038/s41467-025-57355-y

23 https://esdac.jrc.ec.europa.eu/esdacviewer/euso-dashboard/dashboard-stage/

24 Ibidem

25 MAOC separation below 63 micro meter as well as density separation with a liquid of density typically between 1.6 and 1.85 g cm-3 may also be used.

maximum MAOC content in the relevant pedo-environmental zone, as made available by the Commission[27].

The vulnerability indicator shall be classified as follows:

(a) low, where the carbon saturation is smaller than 68 %;

(b) high, where the carbon saturation is equal to or larger than 68 %.

Based on the combination of the hazard and vulnerability indicators, the risk rate (expressed as the share of carbon at risk of being released) shall be determined in accordance with Table 5.

Table 5

		Hazard	
		Low	*High*
Vulnerability	*Low*	2 %	6 %
	High	4 %	10 %

Where the activity area is subject to a flooding risk or to a high or very high landslide susceptibility, the risk rate indicated in Table 5 shall be multiplied by 1.25; where the activity area is subject to both, the risk rate indicated in Table 5 shall be multiplied by 1.5. To this end, operators or groups of operators shall use maps of flooding risks and landslide susceptibility made available by the Commission[28] or national maps.

Groups of operators may use the weighted average of the risk rate across the activity area.

Where risk mitigation practices beyond the eligibility and minimum sustainability requirements are put in place, such as use of deep-rooted crops and diversified crop sequences, operators or groups of operators may adjust the risk rate based on their activity. To this end, the risk rate resulting from the datasets made available by the Commission may be reduced by multiplying it by a factor ranging between 0,8 and 1. Certification schemes may provide additional guidance on these risk mitigation practices and the corresponding factor.

4.1.2. Afforestation and agroforestry

Operators or groups of operators shall assess the suitability of the species and species composition at the beginning of the activity period and at the end of the monitoring period. A tree species shall be considered suitable where current and future climate conditions fall within the ranges of the modelled suitable climate niche for that species or its intended provenance.

To that end, the dataset on current and future species suitability, made available by the Commission[29], may be used. Alternatively, operators or groups of operators may use dedicated national assessments or scientifically validated climate envelope models published in peer-reviewed literature and based on climate scenarios modelled under Representative Concentration Pathway 4.5 or more conservative climate scenarios.

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26 Lugato, E., Lavallee, J.M., Haddix, M.L. *et al.* Different climate sensitivity of particulate and mineral-associated soil organic matter. *Nat. Geosci.* 14, 295–300 (2021). https://doi.org/10.1038/s41561-021-00744-x

27 https://esdac.jrc.ec.europa.eu/esdacviewer/euso-dashboard/dashboard-stage/

28 Ibidem

29 https://data.jrc.ec.europa.eu/collection/id-00445

Operators or groups of operators shall use a risk rate for the activity based on the datasets made available by the Commission[30].

Groups of operators may use the weighted average of the risk rate across the activity area.

Where risk mitigation practices beyond the eligibility and minimum sustainability requirements are put in place, such as co-planting of vegetation inhibiting pest infestation, establishment of fire breaks and fire towers, and ready access to adequate fire-fighting equipment, operators or groups of operators may adjust the risk rate based on their activity. To this end, the risk rate resulting from the datasets made available by the Commission may be reduced by multiplying it by a factor ranging between 0,8 and 1. Certification schemes may provide additional guidance on these risk mitigation practices and the corresponding factor.

4.2. Liability mechanisms

For activities that generate a temporary net carbon removal benefit, a liability mechanism shall be used to cover risks of reversals occurring during the monitoring period and affecting units that have been traded, that is, that are no longer in the operator's account in the registry.

To that end, operators or groups of operators shall either participate in a buffer pool managed by a certification scheme or obtain and maintain sufficient coverage under an insurance policy or comparable guarantee products. The insurance company or comparable guarantee shall fulfil the relevant financial market rules.

Where a buffer pool is used as liability mechanism, after each re-certification audit, certification schemes shall allocate to the buffer pool a share of units that is at least equal to the risk rate established in the risk assessment referred to in Sections 4.1.1 and 4.1.2. The certification scheme shall ensure that, in the event of an unavoidable and avoidable reversal of the carbon underlying units that have been traded, these units are replaced by an equal number of units from the buffer pool. Such units shall have at least the same remaining duration as the units affected by the reversal. For avoidable reversals for which units have been cancelled from the buffer pool, operators or groups of operators shall be fully liable for replenishing the buffer pool with an equivalent number of units of at least the same duration as the units that have been cancelled.

Where insurance is used as liability mechanism, the insurance company shall provide a financial or in-kind compensation in the event of an unavoidable reversal of the carbon underlying units that have been traded. In case of in-kind compensation, the units shall have at least the same remaining duration as the units affected by the reversal. In the event of avoidable reversals, operators shall be fully liable.

Certification schemes shall assess the risks of early termination of the activity, including financial, management and social risks. Based on this assessment, they shall establish liability mechanisms to deter early termination of the activity and to address avoidable reversals in the event of insolvency of operators.

Certification schemes shall ensure the resilience, sufficiency, and solvency of the buffer pool, including through regular stress-testing of the sufficiency of risk coverage. Certification schemes shall publish annually the composition of the buffer pool, including the share of units allocated to the pool by date of issuance, region, and type of carbon farming activity. The stress test shall assess the resilience of the buffer pool to a range of reversal risk scenarios based on, inter alia, the range of risk ratings as well as significant reversal events, affecting

[30] Ibidem

the activities linked to the buffer pool. The stress test shall occur at least every five years and in the event of a significant reversal event. Where necessary based on the results of the stress test, certification schemes shall undertake measures to address risks affecting the resilience, sufficiency and solvency of the buffer pool.

After the end of the monitoring period, the buffered units shall expire and be cancelled in the relevant certification registry.

5. SUSTAINABILITY

5.1. Minimum sustainability requirements

During the activity period, operators shall comply with the following minimum sustainability requirements:

(a) climate change mitigation

When the activity includes conversion of cropland to grassland referred to in Section 1.1.1.1, point (a)(iii), operators may not convert permanent grassland to cropland in the area under their operational control.

For rewetting and restoration of peatlands and of other organic soils, operators may not artificially lower the water table with new drainage systems in the area under their operational control.

For afforestation activities, operators may not convert forest land to cropland or grassland in the area under their operational control.

With the exception of peat present in composted biowaste or used as growing media for agroforestry seedlings or for tree nurseries, peat or peat-containing products shall not be used.

For agriculture on mineral soils, operators may not burn stubble.

(b) climate change adaptation

The activity shall be consistent with local, sectoral, regional or national adaptation strategies and plans, in accordance with national law.

(c) sustainable use and protection of water and marine resources.

Environmental degradation risks related to preserving water quality and avoiding water stress shall be identified and addressed in accordance with Directive 2000/60/EC of the European Parliament and of the Council[31] and with a river basin management plan, developed in accordance with that Directive.

The activity shall not hamper the achievement of good environmental status of marine waters nor deteriorate marine waters that are already in good environmental status as defined in Article 3, point 5, of Directive 2008/56/EC of the European Parliament and of the Council[32].

Where the activity has obtained a development consent addressing the risk of environmental degradation following an environmental impact assessment in accordance with Directive

[31] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327, 22.12.2000, .p. 1, ELI: http://data.europa.eu/eli/dir/2000/60/oj).

[32] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) (OJ L 164, 25.6.2008, p. 19, ELI: http://data.europa.eu/eli/dir/2008/56/oj).

2011/92/EU of the European Parliament and of the Council[33] which includes an assessment of the impact on water or marine waters in accordance with Directive 2000/60/EC or Directive 2008/56/EC, respectively, no additional assessment of impact on water is required.

(d) transition to a circular economy, including the efficient use of sustainably sourced bio-based materials

No minimum requirements apply.

(e) pollution prevention and control

For agriculture and agroforestry on mineral soils and for practices relating to the rewetting and restoration of peatlands and of other organic soils referred to in Section 1.1.2.1, second paragraph, the activity shall comply with the mandatory measures set out in national action programmes established under Council Directive 91/676/EEC[34]. The pollution caused by the application of plant protection products (PPP) shall not increase on average during the activity period as compared to a baseline. For this purpose, the baseline shall assume the continuation of PPP application recorded during the same reference period that is used to calculate the baseline referred to in section 2.3.1 and may reflect the application of PPP that is needed to control outbreaks of pests, diseases and invasive alien species occurred during the activity period.

For the practices relating to the rewetting and restoration of peatlands and of other organic soils referred to in Section 1.1.2.1, first paragraph, the activity may only use pesticides where it is needed to control large-scale outbreaks of pests, diseases and invasive alien species and shall not use fertilisers or manure.

For afforestation, the activity may only use pesticides where it is needed to control outbreaks of invasive alien species or quarantine pests or of large-scale outbreaks of pests or diseases. The activity shall not use fertilisers, except where they are necessary to ensure the survival and growth of young plants, such as in areas affected by desertification, or where specific nutrient imbalances detrimental to tree health are present. In that case, the activity may use bio-ashes derived from untreated biomass, and organic fertilisers, except for livestock slurry or liquid manures. The activity shall comply with Regulation (EU) 2019/1009 and national rules on fertilisers and with Union and national legislation on active ingredients.

Where pesticides are needed, alternative approaches or techniques, such as non-chemical alternatives to pesticides shall be favoured, in accordance with Directive 2009/128/EC.

(f) protection and restoration of biodiversity and ecosystems, including soil health as well as avoidance of land degradation

In areas designated by the national competent authority for conservation or in habitats that are protected, the activity shall be carried out in accordance with the conservation objectives for those areas.

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33 Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (OJ L 26, 28.1.2012, p. 1, ELI: http://data.europa.eu/eli/dir/2011/92/oj).

34 Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (OJ L 375, 31.12.1991, p. 11, ELI: http://data.europa.eu/eli/dir/1991/676/oj).

The activity shall exclude the use or release of invasive alien species in accordance with Regulation (EU) No 1143/2014 of the European Parliament and of the Council[35].

For agriculture and agroforestry on mineral soils and for rewetting and restoration of peatlands and of other organic soils, the activity shall not result in the conversion of habitats specifically sensitive to biodiversity loss or with high conservation value.

For afforestation, the activity shall not result in the deterioration of the conservation status of habitats and species specifically sensitive to biodiversity loss or with high conservation value, nor result in the deterioration of areas designated for the restoration of those habitats and species in accordance with national and Union law, nor result in the deterioration of deadwood or in significant soil degradation.

In addition, for practices relating to the rewetting and restoration of peatlands and of other organic soils referred to in Section 1.1.2.1, first paragraph, the activity shall be in line with applicable restoration objectives and requirements under Union and national law.

5.2. Co-benefits for the protection and restoration of biodiversity and ecosystems, including soil health and the avoidance of land degradation

Operators or groups of operators shall use one or more of the following options to demonstrate compliance of the activity with the obligation to generate co-benefits for the protection and restoration of biodiversity and ecosystems, including soil health and the avoidance of land degradation and to report such co-benefits:

(a) at least one practice has been demonstrated in peer-reviewed scientific literature including synthesis papers, meta reviews or meta-analyses, such as, where applicable, the Commission Evidence library[36], to have beneficial impacts for biodiversity protection or restoration when carried out in similar ecosystems and pedo-climatic conditions;

(b) at least one practice corresponds to a typology of measures referred to in point 14.4 of the Annex to Commission Implementing Regulation (EU) 2025/912[37] and it actively or passively assists in the ecosystem ‘restoration’ as defined in Article 3, point (3), of Regulation (EU) 2024/1991 of the European Parliament and of the Council[38];

(c) at least one practice is aligned with management plans and other implementing measures under Directive 2009/147/EC of the European Parliament and of the Council[39] and Council Directive 92/43/EEC[40] which correspond to the ecological

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35 Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species (OJ L 317, 4.11.2014, p. 35, ELI: http://data.europa.eu/eli/reg/2014/1143/oj).

36 https://datam.jrc.ec.europa.eu/datam/mashup/JRC_FP_EVIDENCE_LIBRARY/index.html

37 Commission Implementing Regulation (EU) 2025/912 of 19 May 2025 laying down rules for the application of Regulation (EU) 2024/1991 of the European Parliament and of the Council as regards a uniform format for the national restoration plan (OJ L, 2025/912, 20.5.2025, *ELI: http://data.europa.eu/eli/reg_impl/2025/912/oj*). The typologies of measures are available at https://biodiversity.europa.eu/europes-biodiversity/nature-restoration/reference-portal-for-nature-restoration-regulation/documentation

38 Regulation (EU) 2024/1991 of the European Parliament and of the Council of 24 June 2024 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.).

39 Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26/01/2010, p. 7, ELI: http://data.europa.eu/eli/dir/2009/147/oj).

requirements of the natural habitats as described in Article 6 of Directive 92/43/EEC or has been qualitatively demonstrated to contribute to improved condition or maintain good condition of a habitat type or a habitat of species of Union interest, using established methodologies such as those under those Directives, or the Union-wide methodology on mapping and assessing ecosystem condition for other ecosystems[41];

(d) for afforestation, additionally to the options described in points (a), (b) and (c), each of the following practices is considered to deliver co-benefits for the protection and restoration of biodiversity and ecosystems, including soil health and the avoidance of land degradation:

  (a) afforestation with at least three tree species whereby each used tree species covers at least 20 % of the total species composition, in a way that species composition is maintained throughout the monitoring period;

  (b) maintenance of pioneering species in open forest and bare soil areas;

  (c) keeping of trees damaged by wind and of deadwood on site;

  (d) promotion of natural regeneration;

  (e) maintenance of riparian buffer zones along streams in the activity area.

5.3. Other sustainability co-benefits

5.3.1. Demonstration of other sustainability co-benefits

Operators or groups of operators may report other co-benefits for sustainability objectives. Those co-benefits may be demonstrated through either:

(a) an activity-based approach: the implementation of a specific practice is assumed to result in the co-benefit; or

(b) a result-based approach: the co-benefit is quantified by showing improvements against relevant sustainability indicators.

Where the activity-based approach referred to in the first paragraph, point (a), is used, the practice shall have been demonstrated in peer-reviewed scientific literature, including synthesis papers, meta reviews or meta-analyses, such as, where applicable, the Commission Evidence library, to have beneficial impacts for the relevant sustainability objectives when carried out in similar pedo-climatic conditions.

Where a result-based approach referred to in the first paragraph, point (b), is used, the sustainability indicators shall be consistent with applicable indicators and methodologies under national and Union legislation, such as Directive (EU) 2025/2360 of the European Parliament and of the Council[42] or Regulation (EU) 2024/1991.

Certification schemes shall enable knowledge sharing on the approaches used to demonstrate the co-benefits.

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40 Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7, ELI: http://data.europa.eu/eli/dir/1992/43/oj).

41 Vallecillo et al., 2022, https://data.europa.eu/doi/10.2760/13048

42 Directive (EU) 2025/2360 of the European Parliament and of the Council of 12 November 2025 on soil monitoring and resilience (Soil Monitoring Law) (OJ L, 2025/2360, 26.11.2025, ELI: http://data.europa.eu/eli/dir/2025/2360/oj).

5.3.2. Examples of sustainability co-benefits from agriculture and agroforestry on mineral soils

The following non-exhaustive list includes examples of co-benefits for sustainability objectives:

(a) climate change mitigation, beyond the temporary net carbon removal benefit and the net soil emission reduction benefit generated through the activity, resulting in:

  (i) a reduction in GHG emissions related to the on-farm use of machinery and energy;

  (ii) a reduction in GHG emissions related to the production of fertilisers;

(b) climate change adaptation, including:

  (i) improved water retention;

  (ii) prevention of soil compaction and erosion;

(c) sustainable use and protection of water and marine resources, including:

  (i) improved water use efficiency and increased water availability;

  (ii) improved infiltration towards the groundwater and improved water quality;

(d) transition to a circular economy, including the efficient use of sustainably sourced bio-based materials, such as the use of:

  (i) fewer resources or certified reused and recycled products;

  (ii) fertilising products made of recovered materials;

(e) pollution prevention and control, including a reduction in air, soil, or water pollution;

(f) protection and restoration of biodiversity and ecosystems including soil health, as well as the avoidance of land degradation, resulting in:

  (i) an improvement in the grassland butterfly index;

  (ii) an improvement in the share of agricultural land with high-diversity landscape feature;

  (iii) an improvement in the farmland bird index;

  (iv) an improvement in soil ecological status.

5.3.3. Examples of sustainability co-benefits from the rewetting and restoration of peatlands and of other organic soils

The following non-exhaustive list includes examples of co-benefits for sustainability objectives:

(a) climate change mitigation, beyond the net soil emission reductions generated through the activity, resulting in:

  (i) a reduction in GHG emissions related to the on-farm use of machinery and energy;

(ii) a reduction in methane emissions resulting from the rewetting[43];

(b) climate change adaptation, including:

(i) increased evaporative cooling and increased thermal conductivity of the soil/peat;

(ii) disaster risk management, through compliance with the technical screening criteria set out in Section 3.1. of Annex I to Commission Delegated Regulation (EU) 2023/2486[44];

(c) sustainable use and protection of water and marine resources, including:

(i) improved water availability and water use efficiency;

(ii) increased water retention and decreased flood risk;

(iii) improved water quality;

(iv) increased base flow;

(d) transition to a circular economy, including the efficient use of sustainably sourced bio-based materials, such as the use of:

(i) biomass from paludiculture;

(ii) dead plant parts, crop residues or compost as organic fertiliser;

(iii) recovered materials;

(e) pollution prevention and control, including:

(i) if the land before rewetting was in agricultural use, the prevention or reduction in harmful phosphorus emissions to the surface waters;

(ii) a reduction in air, soil or water pollution;

(iii) avoidance of soil compaction;

(f) protection and restoration of biodiversity and ecosystems including soil health, as well as the avoidance of land degradation, resulting in the following:

(i) an improvement in the grassland butterfly index;

(ii) an improvement in the share of agricultural land with high-diversity landscape features;

(iii) an improvement in the farmland bird index;

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43 By means of example, through practices included in the Ramsar Technical Report – Convention on Wetlands. (2021). Global guidelines for peatland rewetting and restoration. Ramsar Technical Report No. 11. Gland, Switzerland: Secretariat of the Convention on Wetlands.

44 Commission Delegated Regulation (EU) 2023/2486 of 27 June 2023 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to the sustainable use and protection of water and marine resources, to the transition to a circular economy, to pollution prevention and control, or to the protection and restoration of biodiversity and ecosystems and for determining whether that economic activity causes no significant harm to any of the other environmental objectives and amending Commission Delegated Regulation (EU) 2021/2178 as regards specific public disclosures for those economic activities (OJ L, 2023/2486, 21.11.2023, ELI: http://data.europa.eu/eli/reg_del/2023/2486/oj).

(iv) with respect to paludiculture, an enhancement of habitat structure, species richness, and ecosystem function.

5.3.4. Examples of sustainability co-benefits from afforestation

The following non-exhaustive list includes examples of co-benefits for sustainability objectives:

(a) climate mitigation, beyond the temporary net carbon removal benefit and the net soil emission reduction benefit generated through the activity, resulting in:

(i) a reduction in GHG emissions from non-use of fertilisers, where this is not mandatory under national legislation;

(ii) a reduction in GHG emissions from use of peat-free saplings;

(iii) a reduction in GHG emissions related to the use of machinery and energy;

(iv) increasing carbon storage in deadwood and/or litter;

(b) climate change adaptation, including:

(i) improved flood prevention and water circulation;

(ii) microclimate regulation;

(iii) improved resilience;

(c) sustainable use and protection of water and marine resources, including:

(i) improved water quality;

(ii) improved water retention and decreased flood risk;

(iii) marine ecosystem protection;

(d) transition to a circular economy, including the efficient use of sustainably sourced bio-based materials, including:

(i) sustainable production of biomass;

(ii) energy recovery of any burning natural (organic) materials and other suitable waste;

(iii) use of certified reusable, recyclable or recycled products, e.g. plant pots, tree protectors;

(e) pollution prevention and control, including:

(i) a limitation in waste generation;

(ii) a reduction in air, soil or water pollution;

(f) protection and restoration of biodiversity and ecosystems, including soil health and the avoidance of land degradation, resulting in the following:

(i) an improvement in standing deadwood;

(ii) an improvement in lying deadwood;

(iii) an improvement in the share of forests with uneven-aged structure;

(iv) an improvement in forest connectivity;

(v) an improvement in the share of forests dominated by native tree species;

(vi) an improvement in tree species diversity;

(vii) an improvement in the common forest bird index.