CARBON REMOVALS EXPERT GROUP TECHNICAL ASSISTANCE

Forestry – Technical Assessment Paper

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Contents

Summary

Background and objective
The provisional agreement on the regulation on 'establishing a Union certification framework for permanent carbon removals, carbon farming and carbon storage in products' sets out a voluntary EU-wide framework to certify carbon removals and soil emission reductions in the EU. It focuses on criteria to define high-quality carbon removals and soil emission reductions, and addresses the processes to monitor, report and verify the authenticity of these removals and reductions. The EU carbon removal certification framework will ensure transparency, environmental integrity, and prevent negative impacts on biodiversity and ecosystems. The objective is to provide assurance about the quality of the carbon removals and emission reductions and make the certification process reliable and trustworthy to combat greenwashing. This Technical assessment paper lists criteria and methods that can contribute to this for carbon farming activities related to 'Forestry'.

Approach
The input for this technical assessment paper is based on i) the CRETA review on carbon farming methodologies (July 2023), ii) reports and scientific articles, iii) input from the Technical Focus Group discussions and iv) input from relevant research programs. In the process of developing this Technical Assessment paper for agricultural land, CRETA acquired expert input from experts on specific topics. The Focus Group members were subsequently asked to provide in-depth knowledge and their views on the three Technical Assessment papers regarding the advantages and disadvantages of different certification approaches during thematic meetings based on the quality criteria of: quantification; additionality; storage, monitoring, and liability; and sustainability. The experts participating in the Focus Groups were selected by CRETA and DG CLIMA in close consultation with the Expert Group on Carbon Removals.

Instructions for the summary table
The executive summary table below provides for each section the most important topics that were addressed in the Focus group meetings. For each topic, preliminary findings and next steps are described. The last column with colours gives an indication if the findings were supported by a clear consensus in the Focus group (green). In case of some doubts or partial consensus, yellow was used; orange was used for topics that required further elaboration before a decision can be made.

	DEFINITIONS			
Section	*Topic*	*Preliminary findings*	*Next steps*	*Colour*
2.2.	**Forest definition**	Align the definitions with other policy, laws and carbon certification standards like the LULUCF regulation, the EU Taxonomy framework and definitions used by certification bodies	Decide upon a final definition of forest land that takes other policy, laws (FML) and carbon certification standards like the LULUCF regulation, the EU Taxonomy framework and definitions used by certification bodies into account.	
2.3.	**Forestry activities**	Set clear definitions of the different activities.	Decide upon exact definitions for the different forestry activities.	
2.4.	**Carbon pools**	All forest carbon pools should be taken into account	Practical, workable and cost effective methods should be developed to determine all forest carbon pools.	
	QUANTIFICATION			
Section	*Topic*	*Preliminary findings*	*Next steps*	*Colour*
3.2.	**Quantification approaches for forest carbon stock changes**	Hybrid approach combining modelling, sample data and remote sensing	Define the exact quantification rules for all carbon pools using a hybrid approach	
3.3.	**Quantification of the direct and indirect emissions**	Challenging to develop an approach that is accurate, administratively feasible and cost-efficient	Further review of available approaches	
3.4.2.	**Rules for setting a Standardised baseline**	The value of the approach has been recognised in terms of fairness with early movers, and reduction of administrative burden for the forest owners. However, there are still concerns on key aspects of a standardised baseline.	Continue discussion on how a standardised baseline can be established for forestry.	
3.4.3.	**Rules for setting activity-specific baselines**	Pre-project plots and historical data mainly relevant for afforestation considering the performance of previous land use. For forest management practices, national forest resource models or management plans could be relevant starting points (similar to Forest Reference Levels)	Develop method for activity specific baseline.	

3.5.	**Quantifying uncertainty**	Discounting could be an appropriate tool, but must be calibrated in relation to cost-effectiveness	Further develop insight in uncertainty calculation/quantification	
	ADDITONALITY			
Section	*Topic*	*Preliminary findings*	*Next steps*	*Colour*
4.2.	**Additionality**	Additionality requirements must allow for early movers to participate in the scheme and must not be too complex, while ensuring that certification constitutes an incentive to go beyond (minimal) standard practice	Further review and discussions are necessary to identify approaches that guarantee integrity of the certificates while being administratively feasible	
	LONGTERM STORAGE AND LIABILITY			
Section	*Topic*	*Preliminary findings*	*Next steps*	*Colour*
5.2.	**Duration of activity period**	The duration of the activity period will differ between activities. For management practices, an activity period of five years will likely be the most attractive for foresters, combined with a longer monitor period. Regional conditions could be relevant to consider.	Monitoring periods should be longer than the activity period. For af/re-forestation, the activity and monitoring period must take into account the long- time frames in the sector. For management practices, further review and discussions are needed to identify the appropriate durations.	
5.3.	**Duration of monitoring period**	Every activity should have its own (minimum) monitoring period.	Further define monitoring periods for forestry activities.	
5.4.	**Rules for liability mechanisms**	Buffer method may be the preferred option as it best meets the forest owner's needs	Further develop method for liability mechanisms for insurance and buffer pool for forestry activities.	
	SUSTAINABILITY			
Section	*Topic*	*Preliminary findings*	*Next steps*	*Colour*
6.2.	**Sustainability requirements**	Current EU legislation and certification methods, such as the Taxonomy and FSC/PEFC, include relevant indicators that should form the basis for the biodiversity indicators.	Identify list of relevant indicators for forest related carbon farming activities based on relevant policies, legislation and certification methods	
6.3.	**Monitoring and reporting of co-benefits**	Absence of a commonly accepted and widespread methodology for	Develop method for monitoring and reporting of sustainability co-benefits.	

		monitoring and reporting biodiversity co-benefits		

1. Introduction

In this technical assessment paper, we discuss the potential elements of a certification methodology for carbon removals for forestry. The report is structured according to the QUALITY criteria and the elements to be included in the certification methodologies as listed in Annex I of the CRCF proposal. For these elements the different potential approaches are described, and advantages and disadvantages are outlined.

The input for this technical assessment paper is based on i) the CRETA review on carbon farming methodologies (July 2023)[1], ii) reports and scientific articles, iii) input from the Technical Focus Group discussions.

In the process of developing this Technical Assessment paper, CRETA acquired expert input from topical experts by forming three 'Focus Groups' comprising experts on the certification of carbon removals in Agriculture on mineral soils, Forestry and Peatlands respectively. The Focus Group members were subsequently asked to provide in-depth knowledge and their views on the three Technical Assessment papers regarding the advantages and disadvantages of different certification approaches during thematic meetings based on the QU.A.L.ITY criteria. In total, four Focus Group (FG) meetings were organised in the period October 2023 – January 2024 on the following topics:

- 1st FG meeting: 06-10-2023: Carbon activities and carbon pools
- 2nd FG meeting: 24-11-2023: Quantification
- 3rd FG meeting: 08-12-2023: Long-term storage and Sustainability
- 4th FG meeting: 26-01-2024: Baselines and Additionality

The experts participating in the Focus Groups were selected by CRETA and DG CLIMA in close consultation with the Expert Group on Carbon Removals. The Expert Group was kept up to date of the progress of the Focus Groups by providing the meeting minutes and updates on the Basecamp platform that is used by CRETA to organise the interaction with the Expert Group members. The meetings consisted of a plenary session with a short introduction and a breakout session for the three types of carbon farming for which Technical Assessment papers are developed, followed by a plenary session to exchange the outcomes. The breakout sessions were chaired and documented by CRETA team members, whereas DG CLIMA policy officers were present to answer any regulatory questions regarding the framework proposal. For each topic, CRETA had formulated key questions that needed to be clarified to further develop the Technical Assessment papers and formed the basis for the discussion. The outcome of the meetings is referred to in this Technical Assessment paper in the respective chapters.

It is important to note that all the discussions underpinning these papers happened before the conclusion of the co-decision process on the voluntary framework for certifying permanent carbon removals, carbon farming and carbon storage in products. As a result, some important elements that are in the provisional agreement are not reflected in the discussions. Nevertheless, the authors have tried their best to make sure that all references to the legal text are aligned with the text of the provisional agreement.

[1] The main input in terms of methodologies included in the review originates from a survey that was conducted through the EU Survey website in April-May 2023. This covered most relevant methodologies and only few other methodologies were added to the assessment.

Article 8 of the CRCF Regulation requires that the methodologies should minimise the administrative burden for operators, particularly for small-scale carbon farming. This means that the trade-off between robustness of carbon removals versus the complexity of the methodology will be an important aspect in the technical assessment papers.

This document will be discussed during the 4th EG meeting in April 2024. The feedback and comments on this document will be used to shape the next steps in the development of the certification methodologies. This process will involve more dedicated meetings and interactions, and will result in the preparation of "strawman" certification methodologies (i.e. first drafts of the certification methodologies intended to generate discussion and gather feedback), to be shared in advance of the 5th meeting of the Expert Group (likely in October 2024). More details on the process ahead will be given at the 4th Expert Group meeting in April.

2. Carbon removal activities

2.1 Introduction

This chapter is about the definition of the carbon removal activities and the identification of the carbon pools (Annex I, point (a) and (b) in the CRCF) that should be considered under the forestry methodology. We identified three main questions:

1. Which definition of forest should be adhered to?
2. Which forestry activities should be included in the forestry methodology?
3. Which carbon pools should be taken into account?

These three topics are further elaborated below.

2.2. Forest definition

Definition	From Annex I (a): type of activity and description of the practices and processes covered, including its activity period and monitoring period
Issue	There are several different definitions for forest land that are used in different contexts (see for instance the FISE fact sheet on what is a forest[2] for consequences of using different definitions). Also, different pieces of EU legislation use different definitions of forests. The advantage of having one single definition for forest land is that its use can be standardised in certification systems across countries and provides a more transparent basis for monitoring and verification. However, the resulting carbon credits cannot be transferred 1-to-1 in the LULUCF monitoring and reporting systems of most EU Member States as every country can have its own definition of forest in the LULUCF regulation (EU 2018/841 Annex II). Meanwhile, the proposal for a Forest Monitoring Law (FML) introduces a common definition of forests building on the definition in the LULUCF

[2] Forest Information System for Europe fact sheet 'What is a forest? A view of Europe's forest coverage. https://forest.eea.europa.eu/documents/what_is_a_forest/@@images/file

	regulation and forming the basis for the collection of a unified set of indicators to promote and enable a Union wide forest monitoring framework with comparable data. The proposal will support the implementation of the LULUCF Regulation, by facilitating Member States to monitor what is happening on forest land and linking this to key progress indicators on removals, resilience, as well as biodiversity. The Commission will build on efficient and cost-effective technologies through the use of Earth observation (like Copernicus), it will help reduce the administrative burden for Member States, in particular for those with smaller administrative capabilities. The harmonised approach will ensure consistent and effective forest policies across the EU, keeping down administrative costs for Member States, since they don't need to independently develop such EO tools.
Objective	A clear definition for forests.
Existing certification approaches	The recast of the EU Renewable Energy directive (REDII)[3] includes an indirect definition in Article 29(4); "*continuously forested areas, namely land spanning more than one hectare with trees higher than five metres and a canopy cover of more than 30 %, or trees able to reach those thresholds in situ*". The EU deforestation regulation[4] in Article 2(4) gives the definition; "*'forest' means land spanning more than 0,5 hectares with trees higher than 5 metres and a canopy cover of more than 10 %, or trees able to reach those thresholds in situ, excluding land that is predominantly under agricultural or urban land use",* which matches the FAO definition[5] for forest land. It further defines different types of forest regeneration by separating primary forest, naturally regenerating forest, planted forest and plantation forest. In the EU forest strategy[6] as well as in the proposal for the EU Forest Monitoring Law[7], the FAO definition (0.5 ha, 10m height; 10% crown cover) is used as this is also the definition used by Eurostat[8]. Under the EU LULUCF regulation[9] different minimum values for area size, tree crown cover and tree height parameters are considered for each Member State (Annex II of the LULUCF regulation 2018/841). When considering the different combinations of the three minimum values used to define forest land, only one Member State meets the definition of forest land as used in the REDII, while five meet the definition in the deforestation regulation (and hence the FAO definition). Next to forest land 'other wooded land' is identified. The FAO defines[4] 'other wooded land' as land of more than 0.5 hectares with a canopy cover of 5-10 % of trees able to reach a height of 5 metres in situ; or a canopy cover of more than 10 % when smaller trees, shrubs and bushes

[3] https://eur-lex.europa.eu/eli/dir/2018/2001/2022-06-07
[4] https://eur-lex.europa.eu/eli/reg/2023/1115/oj
[5] www.fao.org/3/I8661EN/i8661en.pdf
[6] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0572
[7] https://ec.europa.eu/commission/presscorner/detail/en/ip_23_5909
[8] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Forest
[9] https://eur-lex.europa.eu/eli/reg/2018/841/2023-05-11

	are included, and the Forest Monitoring Law proposal follows the same definition.	
Options	Pros	Cons
Follow the forest definition as provided in Annex II of the LULUCF regulation 2018/841?	• It is in line with other policy, laws and carbon certification standards, but also the EU Taxonomy framework and definitions used by certification bodies. • Under the LULUCF regulation, MS can trade (a limited amount) of carbon units as part of the available flexibilities) . • If the CRCF is to add / support the LULUCF regulation then the differences in the forest definitions between the MS should be taken into consideration.	• Under the LULUCF regulation, MS use different forest definitions, because of differences in conditions and national circumstances between the countries. • While the definition of forests should be compatible with the LULUCF regulation/ for the purpose of the GHG inventories, it should also be considered how a homogenous set of definitions for forests could affect the transparency and fungibility of the forest carbon farming units on the voluntary carbon market.
Use one single definition (e.g. FAO, Forest Monitoring Law) applicable to forestry related activities in all MS.	• The advantage of having one single definition for forest land is that its use can be standardised in certification systems across MS and provides a more transparent basis for monitoring and verification. • Data gathered in relation to the Forest Monitoring Law can then be used for quantification for example.	• The resulting carbon credits cannot be transferred 1-to-1 in the LULUCF monitoring and reporting systems of most Member States as every Member state has its own definition of forest.
Should also 'other wooded land' be considered for possible carbon certification? While these lands potentially store additional carbon they do not meet the forest definitions.	• Other wooded land and agroforestry should also be taken into consideration. Although they may not meet all minimum requirements for crown cover and/or tree height to meet the forest definition, still considerable amounts of carbon may be stored in living biomass.	• As wooded land, plantations are seen as agricultural practices in some MS. Thus take into account under agricultural practices. • Agroforestry is now considered under agriculture.
Preliminary findings	The general consensus of the experts was to align the definitions with other policy, laws and carbon certification standards like the LULUCF regulation, the EU Taxonomy framework and definitions used by certification bodies. As the carbon removal certification will also support	

	these other pieces of legislation, they should be in line with them. However, relevant discussions regarding these laws and legislations (FML for example) should also be taken into account. Other wooded land should also be taken into consideration as it may store considerable amounts of carbon. However, some types of wooded lands, such as agroforestry and plantations, are regarded as agricultural practices for the purpose of the certification framework.
Next steps	Decide upon a final definition of forest land that takes other policy, laws (FML) and carbon certification standards like the LULUCF regulation, the EU Taxonomy framework and definitions used by certification bodies into account.

2.3. Forestry activities

Definition	From Annex I (a): type of activity and description of the practices and processes covered, including its activity period and monitoring period.
Issue	There are different activities possible to increase carbon removals in forests. These are reforestation, forest management change and afforestation. **Reforestation** This is the activity of replanting trees on deforested land. Counts as reforestation within a certain timespan after deforestation. **Forest management** This is the activity of changing management in a forest which increases the carbon stored compared to the absence of this management. **Afforestation** The activity of planting forest on land previously not being classified as forestland.
Objective	A list of forest activities which can be certified.
Existing certification methodologies	Afforestation, change in forest management practices and reforestation is present in most established methodologies. **Reforestation** **Label Bas Carbone (LBC):** Reforestation on degraded forests after natural disturbances. It provides an incentive for enhanced recovery after a natural disturbance compared to natural regeneration which often is the BAU in France **Verra**: Reforestation and revegetation activities. This may include direct (e.g. manual planting, broadcast seeding) and indirect activities (e.g. activities that permit or facilitate natural regeneration, like herbivory exclosures). **FSC**: Reforestation.

	Gold standard: Reforestation. **Forest management** **LBC**: Conversion of coppices into high stands. **FSC:** The procedure verifies quantifiable positive impacts from management activities on forest carbon stocks, including conservation, avoided deforestation and degradation, improved forest management practices. **Gold standard**: i) Conservation forests (no use of timber) ii) Forests with selective harvesting iii) Rotation forestry **SILVACONSULT:** Increase of the biological sequestration of CO2 in the forest through obligatory adapted forest management and/or obligatory non-use (forest reserves). **ECS:** active additional carbon capture and storage through individual management concept: optimization of forest management, adapting forest to climate change and optimizing stability and diversity. **Afforestation** **LBC:** Afforestation on abandoned overrun lands, croplands and grassland. **Verra**: Afforestation. This may include direct (e.g. manual planting, broadcast seeding) and indirect activities (e.g. activities that permit or facilitate natural regeneration, like herbivory exclosures). **FSC:** Afforestation. **SNK:** Planting of new forest, tree meadows and/or tree rows outside forests (e.g., trees in agroforestry type systems, Trees Outside Forest): **Gold standard**: afforestation.
Key questions	*Questions reforestation:* - What is a good time scale before reforestation can occur, as to not encourage deforestation for reforestation? - Do we need a cut-off date for afforestation and reforestation activities to be considered under the carbon certification system? *Questions Forest management:* - Should we limit the types of management to a specific list? Or allow all types of management changes? - Are there FM practices that are more suitable for the different forest types? - Should only a change in FM be included as a certifiable activity? Because BAU can be regarded as baseline. *Questions afforestation:* - Should certain previous land uses as only viable for afforestation practices be adhered to? Some (LBC) only allow afforestation on certain previous land uses - Should afforestation and reforestation be considered two different carbon removal activities, or could these be considered together? For monitoring and verification, it is easier to assess the change in forest cover. But this will not allow to distinct afforestation and reforestation. To differentiate between afforestation and reforestation longer historic time series of land-use changes are required. This may require some kind of cut off level for afforestation activities as to prevent a claim for carbon credits on recently deforested land.

	- Should there be a time limit since previous degradation or deforestation for considering a tree planting activity to count as afforestation instead of reforestation? LBC takes 10 years into consideration. Spanish method takes 31-12-1989 as reference. - Do we need a cut-off date for afforestation activities to be considered under the carbon certification system?	
Options	Pros	Cons
Reforestation	• New carbon sink created • High potential for sustainability co-benefits	• Limited availability of lands • Possible indirect land use consequences • Potential carbon losses after initial conversion before new build up in carbon pools • High cost of land acquisition
Change in forest management (e.g. climate smart forestry)	• Improve forest management for carbon sequestration • Forest land is already acquired • Many different practices possible	• Might be difficult to optimise management which has already been optimised or other management goals • Many different practices possible • The relevance of a list is limited as every FM activity has its specific requirements
Afforestation	• All non-forest land eligible for afforestation • New carbon sinks created • High potential for sustainability co-benefits	• Possible indirect land use consequences • Potential carbon losses after initial conversion before new build up in carbon pools • High cost of land acquisition
Preliminary findings	During the focus group meeting it was difficult to achieve a general consensus on the above questions as many different interpretations can be given and they differ per country. More reflection is needed to set clear definitions of the different activities. General comments from the focus group members: - Afforestation always refers to land use conversion which has a long term effect on carbon density change. - Reforestation in some Nordic countries is considered a forest management activity. It is standard practice (and a statutory requirement) following harvesting. - In LULUCF context natural regrowth is not considered reforestation but managed forest land. Nevertheless, losses in carbon stocks and reduced carbon removals after harvesting should be considered in reporting these units of land. - Restoration of “degraded forest lands” would be included as a forest management activity for managed forest land. The potential higher net carbon removals compared to the degraded situation then could be certified. - System boundaries are also important. For afforestation and reforestation, the system can be limited to the treated areas. In active forestry, the rule should be	

	that entire properties constitute the system to reduce the risk of leakage within a property (management unit).
Open questions	The following questions are still to be answered: *Questions reforestation:* - What is a good time scale before reforestation can occur, as to not encourage deforestation for reforestation? - Do we need a cut-off date for afforestation and reforestation activities to be considered under the carbon certification system? *Questions Forest management:* - Should we limit the types of management to a specific list? Or allow all types of management changes? - Are there FM practices that are more suitable for the different forest types? - Should only a change in FM be included as a certifiable activity? Because BAU can be regarded as baseline. *Questions afforestation:* - Should certain previous land uses as only viable for afforestation practices be adhered to? Some (LBC) only allow afforestation on certain previous land uses - Should afforestation and reforestation be considered two different carbon removal activities, or could these be considered together? For monitoring and verification, it is easier to assess the change in forest cover. But this will not allow to distinct afforestation and reforestation. To differentiate between afforestation and reforestation longer historic time series of land-use changes are required. This may require some kind of cut off level for afforestation activities as to prevent a claim for carbon credits on recently deforested land. - Should there be a time limit since previous degradation or deforestation for considering a tree planting activity to count as afforestation instead of reforestation? LBC takes 10 years into consideration. Spanish method takes 31-12-1989 as reference. - Do we need a cut-off date for afforestation activities to be considered under the carbon certification system?
Next steps	Decide upon exact definitions for the different forest activities.

2.4. Carbon pools

Definition	From annex I: (b) rules for identifying all carbon removal sinks and GHG emission sources referred to in Article 4(1), (2) and (2a).
Issue	Which carbon pools will be included in the CRCF framework for forestry? Forestry activities can have an impact on multiple carbon pools in the forest. So should all carbon pools as defined in the LULUCF Regulation 2018/841 be included? Note: the carbon pool “Harvested wood products“ belongs to the scope of “Carbon storage in products”. **Above- and Belowground living biomass**

	Aboveground biomass: All biomass of living vegetation, both woody and herbaceous, above the soil including stems, stumps, branches, bark, seeds, and foliage. Belowground biomass: All biomass of live roots. Fine roots of less than (suggested) 2mm diameter are often excluded because these often cannot be distinguished empirically from soil organic matter or litter.[10] **Litter** Includes all non-living biomass with a size greater than the limit for soil organic matter (suggested 2 mm) and less than the minimum diameter chosen for dead wood (e.g. 10 cm), lying dead, in various states of decomposition above or within the mineral or organic soil. This includes the litter layer as usually defined in soil typologies. Live fine roots above the mineral or organic soil (of less than the minimum diameter limit chosen for below-ground biomass) are included in litter where they cannot be distinguished from it empirically.[10] **Deadwood** Includes all non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood (DW) includes wood lying on the surface, dead roots, and stumps, larger than or equal to 10 cm in diameter (or the diameter specified by the country).[10] **Soils** *Mineral soils:* Includes organic carbon in mineral soils to a specified depth chosen by the country and applied consistently through the time series. Live and dead fine roots and dead organic matter (DOM) within the soil, that are less than the minimum diameter limit (suggested 2 mm) for roots and DOM, are included with soil organic matter where they cannot be distinguished from it empirically.[10] *Organic soils[11]:* Organic soils are found in wetlands or have been drained and converted to other land-use types (e.g., Forest Land, Cropland, Grassland, Settlements). Organic soils are identified on the basis of criteria 1 and 2, or 1 and 3 listed below (FAO 1998): 1. Thickness of organic horizon greater than or equal to 10 cm. A horizon of less than 20 cm must have 12 percent or more organic carbon when mixed to a depth of 20 cm. 2. Soils that are never saturated with water for more than a few days must contain more than 20 percent organic carbon by weight (i.e., about 35 percent organic matter). 3. Soils are subject to water saturation episodes and have either: a. At least 12 percent organic carbon by weight (i.e., about 20 percent organic matter) if the soil has no clay; or b. At least 18 percent organic carbon by weight (i.e., about 30 percent organic matter) if the soil has 60% or more clay; or c. An intermediate, proportional amount of organic carbon for intermediate amounts of clay.

[10] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, VOL4, AFOLU. Chapter 1, Table 1.1. https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html

[11] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, VOL4, AFOLU. Chapter 3, Annex 3A.5.

Objective	A clear list of carbon pools that should be included in the certification of forestry activities.	
Existing certification methodologies	Most methodologies take above- and belowground living biomass into account as carbon pool. Only a few methodologies take litter, deadwood and soils into account as carbon pools. LBC: Takes above- and below-ground biomass into account. Litter, dead wood and soil carbon into account depending on the scheme which is used. For reforestation for example, all are taken into account. For afforestation, dead wood is not taken into account. VERRA: Above- and belowground biomass included in afforestation and reforestation. For management change only aboveground biomass is included. FSC: takes all pools into account. SNK: takes all pools into account. EVA: Above- belowground biomass. Gold standard: Above- belowground biomass Zertiforest: Aboveground biomass	
Key questions	*Questions deadwood:* - DW is difficult to measure and sometimes also taken out in the forest due to fire risk, should this be included? - DW + Litter together is often not taken into account by carbon certification methodologies because it can be difficult to measure, is it desirable to be taken into account? *Questions soils:* - Until what depth do soils have to be taken in account? 0-30 m? - Some activities for FM disrupt soil carbon, is it desirable to then exclude soils from certification? ***Key question for all carbon pools:*** should all carbon pools be taken into account? Or can a certain certification scheme choose whether to include one or not? As certain management practices can have a positive influence on a certain carbon pool but a negative on the other.	
Options	Pros	Cons
Should all carbon pools be taken into account?	• Forestry activities can have an impact on multiple carbon pools. • Deadwood is an important criterium in the nature restoration law.	• Difficult carbon pools are dead organic matter (litter and deadwood) and soil carbon. Many countries do not have inventories for soil carbon in place. (Forest

		and soil monitoring law could supply data) • Soil monitoring is currently rather difficult and expensive, therefore there is a strong need for new and more innovative monitoring approaches. (Soil monitoring law could supply data).
Can a certain certification scheme choose whether to include one or not?	• Easier to report.	• A forestry activity can have an impact on a carbon pools which might not be included. Which might result in overestimation of the carbon removal.
Preliminary findings	General consensus: All experts agreed that all carbon pools should be taken into account, but also that this will be difficult and practical workable solutions should be investigated. Difficult carbon pools are dead organic matter and soil carbon (many countries do not have inventories for soil carbon in place). Possible solutions were taking numbers from the NGHGI of that specific country/area, as well as the use of models. When research on the monitoring of soil carbon has improved, start using more specific data. Notes: - All pools should be included at all times for transparency, using a practical approach to use the best available data and models. The FSC and EU Taxonomy already require all pools to be taken into consideration. - If very exact monitoring for each carbon pool would be required, this would become very expensive with the risk that no or very few forestry projects will be initiated. Instead, provide a list of minimum set of pools and define a minimum quality level for reporting each of the pools, with more complex methods for biomass and more general modelling for soils.	
Next steps	Practical, workable and cost effective methods should be developed to determine all forest carbon pools.	

3. Quantification

3.1 Introduction

Carbon removal / soil emission reduction practices need to be quantified accurately and deliver unambiguous benefits for the climate. In this technical assessment paper the following themes about quantification are discussed:

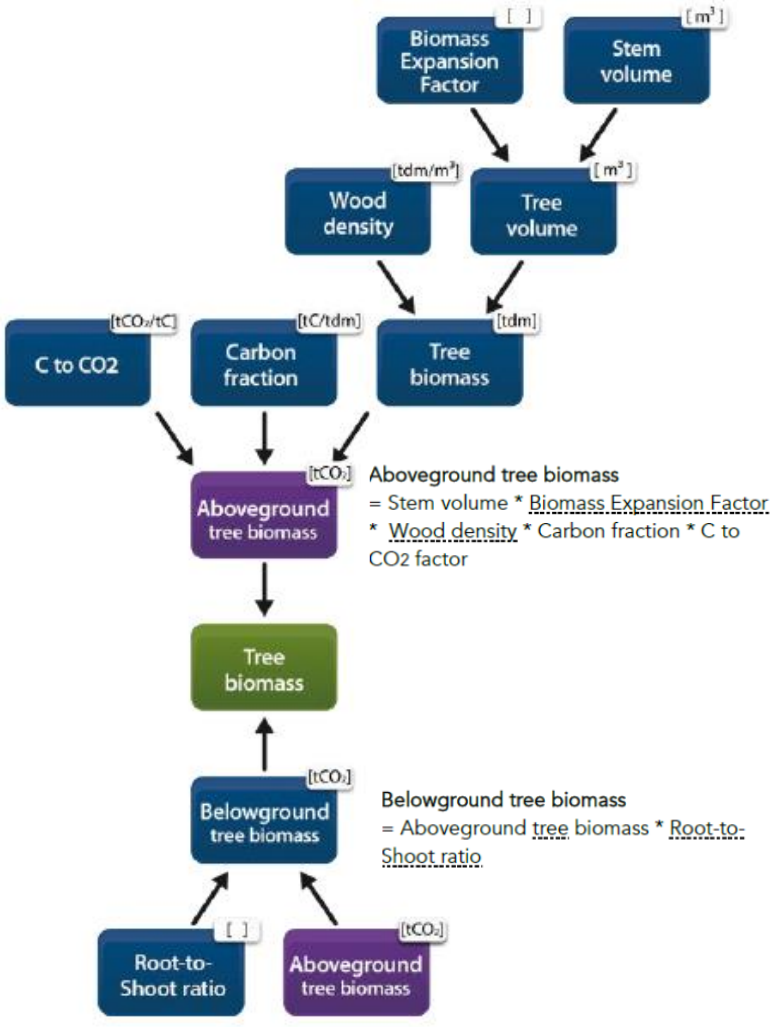
1. Quantification approaches for forest carbon stock changes.
2. Quantification of the direct and indirect emissions
3. Rules for baselines
4. Quantification of uncertainty

3.2. Quantification approaches for forest carbon stock changes

Definition	From Annex I of the CRCF provisional agreement: d) rules for calculating the total carbon removals referred to in Article 4 (1), point (b), or in Article 4 (2.1), point (b), or in Article 4(2a) point (b); Article 4 (2.1), point (b): CR_{total} is the total carbon removal of the activity,
Issue	There are several options to quantify carbon stock changes in the relevant forest carbon pools living biomass, litter, and dead organic matter (soil is included in the soil theme, but in order to be complete should be considered for forest carbon credits as well) either through direct field measurements, modelling, earth observation or a combination thereof. For quantifying carbon stocks and changes in carbon stocks currently field measurements are the most applied approach. While earth observation approaches are operational for assessing activity data (i.e. what is going on, e.g. Forest area, tree cover density, etc.), it still needs field data for calibrating subsequent carbon stocks and changes therein. Modelling is used to assess baseline forest developments and to more specifically quantify age/size dependent development in between measurement points. Also models rely on field measurements for their parameterisation and calibration. The provisional political agreement on the Regulation requires that "The monitoring shall be based on an appropriate combination of on-site measurements with remote sensing or modelling according to the rules set out in the appropriate certification methodologies." Therefore, monitoring could not be based exclusively on remote sensing or modelling, and some form of on-site measurement is required. The field methods asked for in most certification schemes for forests are usually rather straight forward and involve measurements of diameters of trees and dead organic matter and measuring the thickness of litter layers. However, in order to quantify carbon stocks these auxiliary data still need to be converted to values in terms of carbon stocks. Most of the existing certification schemes give some information on how the carbon stocks in living biomass in projects (here activity) and baselines need to be quantified. This combines direct measured information on tree

diameters and/or stem volume in combination with allometric functions to convert from diameters or stem volumes to whole tree aboveground volume (stem, and branches), so-called conversion factors. Then this information on total aboveground biomass is further expanded to total aboveground biomass using biomass expansion factors (BEF) using information on the density of the wood (dry weight per unit of fresh volume). To also get the belowground (root) biomass usually a root-to-shoot (R) ratio is applied. See figure below. Finally, to convert the dry weight biomass to carbon stock, a carbon conversion factor is applied, which usually is around 0.5 (approximately 50% of woody biomass is made up by carbon, exact value is species and conditions specific).

Sometimes combined biomass conversion and expansion factors are used that combine all previous mentioned conversion and expansion factors (these are called Biomass Conversion and Expansion Factors, BCEF).



Figure, based on the methodology for afforestation/reforestation (a/r) GHGs emission reduction & sequestration (version 2.0) of the Goldstandard.

To get to the living biomass measured information on tree diameters is multiplied by the biomass conversion and expansion factors to get to the total carbon stock. This means that any uncertainty on the biomass

	conversion and expansion factors is directly expressed in the resulting carbon stock. The multiplication of the factors also means that e.g. a 10% error (or overestimation) in one of the conversion and expansion factors results in a 10% increase in carbon stocks and if one calculates before and after changes in carbon stocks in living biomass that the increases are also 10% higher than if a 10% lower conversion factor was used. Hence the calculations and resulting carbon removals are very sensitive for the biomass conversion and expansion factors. Hence these biomass conversion and expansion factors are extremely important for quantifying carbon stocks and changes in carbon stocks and hence carbon removals. To measure or collect some of these factors, however, may be very labour intensive and hence expensive. For converting stem volumes to whole tree volume and tree biomass until recently trees had to be destructively sampled. More recently, terrestrial lidar scanning and other optical approaches for assessing tree volumes and biomass as the assessment of diameter – height relations and biomass expansion – are being developed. These techniques would eventually allow to determine plot level volumes. Results are promising, but methodologies are not yet advanced enough to apply at scale (only in experiments).
Objective	Clear rules on how a robust assessment can be made of the carbon removal, of all carbon pools, from a carbon removal activity, using an appropriate combination of ground sampling, modelling and earth observation.
Existing certification methodologies	While a minority of existing certification schemes include a preference for local/project specific biomass conversion and expansion factors none actually have this as a compulsory requirement and most provide information on alternative sources of information for default factors. National certification schemes like Label Bas Carbone (France) and SNK (Netherlands) provide country specific factors that have to be applied. The SNK scheme applies the BCEF that is also used in the GHG inventory of the LULUCF sector for the Netherlands. This BCEF combines country specific allometric equations with otherwise default factors from the IPCC guidelines. The EU Governance regulation (i.e. in Annex V, part 3) requires the use of higher tier methodologies by means of improving the accuracy and quality of the GHG inventories. For most Member States this likely means that for forest land Tier 3 methodologies need to be applied. While the IPCC guidelines are not very specific for what this means for the biomass conversion and expansion factors, most MS that claim to use Tier 2 or Tier 3 methods for calculating carbon stock changes in living biomass under Forest land, actually apply (mixes of) default and country specific biomass conversion and expansion factors[12].

[12] This was shown in a recent study (unpublished) for EEA: "*Gap analysis between requirements of the LULUCF regulation and methodologies Applied by European Countries to Calculate LULUCF Emissions and Removals*"

Key questions	What role could earth observation and modelling play in quantifying carbon stocks and carbon removals? What is the best approach to ensure sufficient accuracy and timeliness? Given the requirements for higher Tier level from the LULUCF regulation, what would be the best approaches for calculating carbon stocks and carbon stock changes in living biomass for afforestation, reforestation and forest management carbon removal activities? What level of Biomass Conversion and Expansion Factors (BCEF) should be preferable? Are there approaches that should not be allowed? • Project/activity specific BCEF's • Country specific values, eg. From the NIR of the country in which the carbon removal activity is implemented? • Own certification scheme regional default BCEF's • Tier 1 IPCC or other default values?	
Options?	Pros	Cons
What role could earth observation and modelling play in quantifying carbon stocks and carbon removals? What is the best approach to ensure sufficient accuracy and timeliness?		
Use earth observation (e.g. satellites, but also LiDAR) *	• If calibrated well, can provide regular updates on carbon stocks and carbon stock changes and effects of forest management. • Allow integration over a larger forest area – interpolation from forest plots • Reduce costs, especially of compiling annual datasets	• Still needs field data for calibration of carbon stocks and carbon stock changes. • If relatively small areas are covered, limited added value regarding interpolation across the area considered for the carbon removal activity because observations could be coarse
Use models*	• Allow to refine for age and/or size dependent developments in between the start and end of the carbon removal activity • Setting a BAU baseline, while still considering the age and/or size dependent effect on forest development.	• Still needs field data for calibration of carbon stocks and carbon stock changes.
Use field data	• Allows for accurate information on forest structure and carbon stocks in the living biomass, litter and dead organic matter carbon pools.	• Gives very specific information for a certain location and moment in time. • Effect of the choice of the BCEF is generally underestimated. See next key question.

Use mixed approaches	• All mentioned above, but how to best combine the different approaches? • Could be cost effective way of determining carbon stocks	• Challenge in defining the appropriate mix of approaches since these may vary depending on the specific activity
* Note: Options marked with an asterisk were still open for discussion at the time when the focus groups held a discussion on this topic; however, following the provisional political agreement on the Regulation, those options should be discarded in light of the provision which requires on-site monitoring combined with either modelling or remote sensing (or both).		
What level of Biomass Conversion and Expansion Factors (BCEF) would be preferable? Are there approaches that should not be allowed due to uncertainties?		
Project/activity specific BCEF's (IPCC Tier 3 level)	• Allows accurate quantification of carbon stocks and carbon stock changes for living biomass	• Time consuming and expensive to develop Tier 3 biomass conversion and expansion factors. New techniques using Terrestrial Laser Scanning (type of LiDAR) or other optical systems may overcome this burden
Country specific values, e.g. from the NIR of the country in which the carbon removal activity is implemented	• More specific and representative for the local conditions than (Tier 1) or certification scheme specific conversion and expansion factors. • No additional cost at the level of the carbon removal certification activity	• Depending on the methodology in the Member State ○ Potentially less accurate and representative than project/activity specific factors ○ Does potentially not meet the Tier 3 requirements for forest land under the Governance/LULUCF regulation
Own certification scheme regional default BCEF's	• Partly similar to the country specific values, but depending on how the scheme is used may be more or less representative for the carbon removal certification activity. • No additional cost at the level of the carbon removal certification activity	• Less accurate and representative than project/activity specific factors • Does not meet the Tier 3 requirements for forest land under the Governance regulation
Tier 1 IPCC or other default values	• Readily available, no additional cost at the level of the carbon removal certification activity	• Less accurate and representative than project/activity specific factors

		• Does not meet the Tier 3 requirements for forest land under the Governance/LULUCF regulation
Related to baseline How to ensure consistency between the standardised baseline and quantification of the carbons stock changes for the carbon removal activity?		
Have standardised baselines at the level of volumes and apply the same BCEF's to both realised/measured volume changes for the carbon removal activity and for the standardised baseline	• Consistency between standardised baseline and carbon removal activity. • More flexible • Can be adjusted if improved BCEF's become available	• An additional step is needed for calculating baseline carbon removals.
Have standardised baselines at the level of carbon stocks	• Can be readily used	• Potential inconsistencies between baseline and carbon removal activity
Preliminary findings	General consensus: Although modelling could reduce costs, sampling is still required to validate models. A hybrid approach therefore seems preferable. Notes: - Be mindful that many land owners/managers already adopted MRV practices, which should ideally be built on where relevant. It is important to engage land owners/managers in these discussions and developments, as they are going to implement the proposed solutions, otherwise expertise might be lost. - Minimum requirements should be established by finding a good denominator and lifting the lower benchmarks up to a higher standard. - The monitoring frequency and parcel size should be determined, including accuracy standards, as it impacts the design of other parameters. - The role of modelling could be seen to suppress monitoring and reduce costs, but expansion factors have a strong effect on the calculation of carbon stocks. - Ex-ante may be used for certain activities to get investments early, which could later be converted to ex-post. - In terms of quantification, tree biomass is straightforward, whereas deadwood and litter as well as soils are most difficult. The risk exists that more money is spent on MRV for soils than revenue generated by the removal activity.	
Open questions	Which BCEF's need to be used?	

Next steps	Define exact quantification rules for all carbon pools using a hybrid approach.

3.3. Quantification of the direct and indirect emissions

Definition[13]	From annex I: (e) rules for calculating $GHG_{associated}$ emissions referred to in Article 4(1), point (c), in Article 4 (2.1), point (c), in Article 4(2.2), point (g), and in Article 4(2a), point (c); (c) $GHG_{associated}$ is the increase in direct and indirect greenhouse gas emissions, over the entire lifecycle of the activity which are due to its implementation, including indirect land use change, calculated, where applicable, in accordance with protocols set forth in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and any further refinement.
Issue	Implementation of new carbon farming practices that aim to increase carbon removals might involve an increase of direct GHG emissions, e.g. from increased fuel use, use of fertilizer or indirect GHG emissions, such as from land use change. One of these indirect emissions could be leakage resulting from the land use change because activities shift from on location to another due to the activity (e.g. increased wood harvest on a different forest plot). As these emissions reduce the effectiveness of the carbon removal practice, the increase of emissions must be subtracted from the quantified carbon removals. The direct emission sources that are involved depend on the type of carbon removal practice, but in general quantification is rather straightforward based on IPCC guidance or making use of emission factors from national GHG inventories. For indirect emissions it is less clear as these can often not be quantified directly and default numbers might have to be used, as is the case in the GHG calculations for the Renewable Energy Directive. An alternative can be to exclude certain carbon removal practices that might have a high risk on ILUC.
Objective	Clear rules on how a robust assessment can be made of the $GHG_{associated}$ from direct and indirect emissions resulting from the carbon removal activity.
Existing certification methodologies	**Verra:** calculates direct and indirect emissions. **Gold Standard[14]:** Indirect: Leakage arising from the following are accounted: a. collection of wood (for firewood, charcoal, etc.), b. timber harvesting

[13] The definition of article 4(1) point (c) regarding associated emissions has changed since the first CRCF proposal was published, shown here is the article as written in the provisional agreement. This technical assessment paper and the discussion explained in it is based on the CRCF proposal so some points might be outdated a bit compared to the provisional agreement of the CRCF. One big change is the mandatory incorporation of the impact of indirect land use change (ILUC).

[14] https://globalgoals.goldstandard.org/403-luf-ar-methodology-ghgs-emission-reduction-and-sequestration-methodology/

<table>
<tr><td></td><td colspan="2">c. agriculture (crop cultivation, shrimp cultivation, etc.), d. livestock.

3.7.5 | Category a, b & c leakage emissions shall be determined as per the formula below.

Leakage Project area [tCO₂] Eq. 6

= Area [ha] × % of activity-shift [%] × CO₂-stock [tCO₂/ha]

Where,

Area = Land within the project area where the activity is taking place

% of activity-shift = Percentage of the activity that
– will be displaced during the crediting period, AND
– will have impact on the 'tree biomass' outside the project area
The factor is determined by:
– credible estimations, OR
– a representative survey

CO₂-stock = Average stock of 'tree biomass' on the area where the activity will be displaced to

Gold Standard uses a formula to calculate the leakage per activity based on the percentage of activity shift.

Zertiforest: Addressing uncertainties / indirect emissions based on ISO 14064-2.

ECS Climate forest: Buffer against potential additional related GHG Emissions. No additional emissions are caused by optimised sustainable forest management. If actions would cause relevant GHG emissions, they would be calculated by gasoline consumption and subtracted from carbon capture.

Woodland Carbon Code: Indirect emissions are included.

Some methodologies do not take indirect emissions into account.

Methodologies take a certain “leakage rate“ into account. On the specific rate, when and how it is applied there is no consensus yet.[15]</td></tr>
<tr><td>Key questions</td><td colspan="2">How can indirect emissions from land use change (ILUC) best be addressed and considered, given their complexity?

How can the increase in direct and indirect GHG emissions be measured? To determine the increase in direct and indirect GHG emissions there is the need to know the baseline of direct and indirect GHG emissions.</td></tr>
<tr><td>Options</td><td>Pros</td><td>Cons</td></tr>
<tr><td>Excluding carbon removal activities with high risk of ILUC</td><td>• Simpler approach</td><td>• Difficult to judge beforehand which activities have a high risk on ILUC, but a non-exhaustive list of the most problematic activities building on previous experiences could be a starting point</td></tr>
</table>

[15] Haya BK, Evans S, Brown L, Bukoski J, Butsic V, Cabiyo B, Jacobson R, Kerr A, Potts M and Sanchez DL (2023) Comprehensive review of carbon quantification by improved forest management offset protocols. Front. For. Glob. Change 6:958879. doi: 10.3389/gc.2023.958879

Quantification of indirect emissions.	• Regarding leakages: Takes "shift of activities" to another location into account resulting from the carbon removal activity.	• Difficult to quantify and many different methods in current certification methods.
Preliminary findings	General consensus: There may not be enough data to determine indirect emissions. It is important to set the system boundaries and determine which leakages are included.	
Open questions	How can indirect emission from land use change (ILUC) best be addressed and considered, given its complexity? How can the increase in direct and indirect GHG emissions be measured? To determine the increase in direct and indirect GHG emissions there is the need to know the baseline of direct and indirect GHG emissions.	
Next steps	Develop method to quantify direct and indirect emissions.	

3.4. Rules for baseline

3.4.1. Introduction

The first step in the Quantification process is that operators should quantify the amount of additional carbon removals/soil emission reduction that a carbon removal activity has generated in comparison to a baseline. A standardised baseline, reflecting the standard performance of comparable practices and processes in similar social, economic, environmental, technological and regulatory circumstances and take into accountant the geographical context, including local pedoclimatic and regulatory conditions, is the default baseline according to the provisional agreement on the CRCF regulation. This should ensure objectivity, minimise compliance and other administrative costs. An activity-specific baseline is only allowed by way of derogation, where duly justified in the applicable certification methodology, including due to the lack of data or the absence of sufficient comparable activities, an operator shall use a baseline that corresponds to the individual performance of a specific activity (section 3.4.3).

In the context of carbon farming, the use of available digital technologies, including electronic databases and geographic information systems, remote sensing, artificial intelligence, and machine learning, and of electronic maps should be promoted to decrease the costs of establishing baselines and of monitoring carbon removal activities. To reflect the social, economic, environmental, and technological developments and to encourage ambition over time in line with the Paris Agreement, baselines should be periodically updated.

3.4.2. Standardised baseline

This section has been developed by JRC, who will assist the Commission in the development of the standardised baselines.

Definition	Rules for calculating the carbon removals under the baseline referred to in Article 4(1). Net carbon removal benefit = $CR_{baseline} - CR_{total} - GHG_{associated} > 0$ **$CR_{baseline}$ is the carbon removals under the baseline;** (5) The baselines shall be highly representative of the standard performance of comparable practices and processes in similar social, economic, environmental, technological and regulatory circumstances and take into account the geographical context including local pedo-climatic and regulatory conditions ('standardised baselines'). (6) By way of derogation from paragraph 5, where duly justified in the applicable certification methodology, including due to the lack of data or the absence of sufficient comparable activities, an operator shall use a baseline that corresponds to the individual, performance of a specific activity ('activity-specific baseline').
Issue	The estimation of land C fluxes (emissions/removals) is highly challenging process that may lead to different results depending on data and methodologies applied (McGrath et al., 2023). So far, there is not a consolidated method, but an ensemble approach (e.g. the use of multiple diverse model to predict an outcome) may provide the best estimate overcoming each methodology limitation. One of the main problems is that complex scientific tools and large amount of data are used in the scientific community to derive territorial land fluxes, which can be difficult to operationalize in a simple equation.
Objective	Set a robust methodology to set standardised baselines for calculating the net effect of carbon removal activities through net carbon emission/removals (from soil and vegetation) that reflects the current status of homogenous areas for type of land cover/use and pedo-climatic conditions.
Existing certification methodologies	The baseline is often defined as fixed (measuring the removal/emissions rates at the start the project) or dynamic (updating the values over time). Different methodologies ranging from sampling to modelling and hybrid approaches are used depending on the certification scheme, including project specific and (to a lesser extent) standardised (Oldfield et al., 2021; McDonald et al., 2021; Batjes et al., 2023). For temperate and boreal forest guidelines are also available[16]. Some mechanisms allow for a standardised baseline calculated over a geographic region, which can be set based on growing conditions (soil type, climate, socio economic circumstances) or , in case of lack of data at national of jurisdictional level. It is more used in the forestry sector (e.g. NZ Permanent Forest Sink Initiative, Woodland Carbon Code, California's Compliance Offset Programme)
Key questions	**Similar social, economic, environmental and technological circumstances**

[16] https://verra.org/wp-content/uploads/imported/methodologies/VM0012-Improved-Forest-Management-Projects-in-Temperate-and-Boreal-Forests-LtPF-v1.2.pdf

	○ Which data and variables can be used to describe the 'social' and 'economic' dimensions (e.g. farmer income, farm size, wood prices, etc.)? Otherwise, should the 'social', and 'economic' dimensions be defined in a simpler way, for instance considering administrative regions (e.g. NUTS 1-2-3) as strata? In case administrative units are chosen, which NUTS level is more appropriate? ○ What fundamental 'environmental' dimensions strata are envisaged to develop a standardised baseline (e.g. specific soils properties, climate, vegetation properties –, tree species, stand age, forest management policies etc.)? ○ Should pan EU dataset (e/g LUCAS, Copernicus data, ESA CCI biomass maps etc.) be preferred as environmental strata to guarantee a high level of standardisation or national (sub-regional data) be prioritized? Could you indicate data layers that you consider good datasets for your specific sector of interest? **Carbon removal performance / Greenhouse gas increase** ○ The carbon removal performance is expressed as GHG fluxes. What impact does this have on early movers that have already achieved high C stocks and have consequently low removal rates? Is it recommendable and/or fundamental to reward them? ○ What data are needed to establish the baseline for calculating the GHG (i.e. not only CO_2 but also N_2O and CH_4) due to the implementation of the carbon farming activity? Would a standardised baseline be possible for these fluxes? Could they be approximated by lower tier IPCC-based calculations? **What does "standardised" mean?** ○ In your view, should the standardised baseline be dynamic (i.e. represent a trend over the period in question) or static? ○ How long should the reference period needed to calculate the standardised baseline be? Should it differ by sector such as agriculture/forestry/peatland), and if so how? ○ Could data from the National Greenhouse Gas Inventories be used? If based on higher tiers and spatial explicit approaches, would these able to provide regional emissions/removals? ○ An activity- specific approach can be used in the absence of data to develop robust standardised baselines. Based on your knowledge on the currently available data and methodological approaches, in which sectors (forest, peatland and agriculture) could the standardised baseline be applicable from the start? The proposal envisages a transition phase in which the project specific approach can be used while robust standardised baselines are developed. Based on your knowledge on the currently available data and methodological approaches, in which sectors (forest, peatland and agriculture) could the standardised baseline be applicable from the start?

Options	Pros	Cons
Use of Pan-EU elaborated dataset (e.g. soil maps, Copernicus data, land cover, ESA CCI biomass maps etc.)	• Provides a standard • Freely available for MS • Less systematic biased among MS • It could represent strata for identifying the areas defined as comparable in terms of growing conditions	• Likely less accurate than national local datasets • Time dependence of the product • Underlying raw data not easily available or manageable for further elaboration • Local conditions may be very different compared to those obtained from the coarse pan-EU datasets.
Use of soil and forest inventories: At national or local scale, e.g. National Forest Inventory data, but also LUCAS soil sampling point data	• Direct measure of a state variable • Better local knowledge • Data already available or probably required for Soil monitoring law (if adopted) • New data collected by the operators in the course of the certification period	• Mainly limited to SOC content and forest structural parameters • NFI and forest plots data not always publicly available • Lag between sampling and data usability (less useful for dynamic baseline) • Sampling density and representativeness • Elevated cost • Variability and standardisation
Earth observation based datasets of state variables (e.g. aboveground stocks) and management activities	• Good spatial representation and distribution • Timely estimate (including effects of recent climate change effect on vegetation states, ideal for dynamic baselines) • Cost-effectiveness	• Mostly limited to aboveground biomass and few key parameters • Rely on the use of modelling to calculate the net C removals from the monitored state variables (e.g. allometric equations) • Representative only of the last years (limiting for baselines calculated over long past periods) • The products require ground datasets for validation
Process-based modelling	• Cost-effective • Easily updatable • All C fluxes and stocks • 'Projected' and 'dynamic' baseline development	• Requiring high skills • Calibration and validation • Computational time for regional simulations • Data demanding • High uncertainty even when calibrated
Preliminary findings	General consensus: the value of the approach has been recognised in terms of fairness with early movers, and reduction of administrative burden for the forest owners. However, there is still scepticism on key aspects of a standardised baseline, requiring further discussions and clarifications. General comments: - In California (USA) the applied concept a standardised baselines has performed very poor. If the goal is to get precise carbon removals,	

	standardised baselines will not work. Important to learn from available examples[17]. - For improved forest management a standardised baseline will be difficult because some forest stands by coincidence have a more favourable condition (e.g. less carbon or carbon removals compared to the standard baseline). - Afforestation should be compared to the original carbon stored and captured in the original land use. Starting situation may be very different for even adjacent fields and therefore may not work well for incentivising actions of land owners/managers. - Important to be mindful of what factors are combined for assessing carbon removals in the standardised baseline. Also the timing of when the assessment will be done will be important, land owners could wait for it or try to influence this by changing the carbon stock on their land. - Concerns about using a standardised baseline especially in the case of areas with long forest management practices. A standardised baseline will already create winners and losers without them having to do anything. There should be incentives for actions the forest owners implement. - Consider how the baseline is used. E.g. if you use a dynamic baseline (baseline shifting with regional developments, also through time) based on changing behaviour e.g. if all landowners in a region implement the same activities then with a dynamic baseline at a certain point you will decrease the financial incentive.
Open questions	All key questions.
Next steps	Continue discussion on how a standardised baseline can be achieved for forestry.

3.4.3. Activity specific baseline

Definition	Rules for calculating the carbon removals under the baseline referred to in Article 4(1). Net carbon removal benefit = $CR_{baseline} – CR_{total} – GHG_{associated} > 0$ **$CR_{baseline}$ is the carbon removals under the baseline;** (6) By way of derogation from paragraph 5, where duly justified in the applicable certification methodology, including due to the lack of data or the absence of sufficient comparable activities, an operator shall use a baseline that corresponds to the individual, performance of a specific activity ('activity-specific baseline').
Issue	The quantification of removals should be based on a robust approach and provide reliable outcomes. As currently no standardised baseline is available, most projects are likely to use an activity specific baseline in the first years after the start of the CRCF. Clear rules for an activity specific baseline are to be set out in the methodologies.

[17] https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.15943

	The following aspects might have to be addressed: • The type of baseline being used will depend on the quantification approach and how (potential) ex-ante quantification or ex-post quantification will be done and utilised • Defining the duration of the pre-activity period on which the baseline will be calculated • Frequency of updating the baseline (this is also related to the definition of the activity period, see Chapter 5.1)
Objective	Establishing rules/criteria for calculating an activity specific baseline.
Existing certification methodologies	**LBC**: Different baselines are applicable. They are representative of usual scenarios of forestry development. **VERRA**: The crediting baseline is set using a dynamic performance benchmark. A control area is selected at the start of the project, and a stocking index for the project area and control area is monitored using remote sensing at every verification event (at least every 10 years). **FSC:** Forest managers may use either a previous measurement of forest carbon stocks in their management unit (project-specific) or refer to a regional reference level such as a recent national forest inventory (performance or standardized baseline). **Silvaconsult:** Works along the United Nations Framework Convention on Climate Change (UNFCC, 2008): Simplified baseline and monitoring methodologies for small-scale afforestation and reforestation project activities under the clean development mechanism implemented on grasslands or croplands AR-AMS0001. - The Baseline Scenario is calculated according to forestry parameters based on yield tables and scientifically validated conversion factors from tree biomass to carbon, including aboveground and below ground biomass. - Projects based on adapted forest management are generating ex-post credits. Projects that are based on forest reserves ("set asides, so no commercial harvesting) or afforestation generate ex-ante credits. -hybrid. four parameters for calculating baseline: tree species distribution; yield tables per tree species and sub-project area; site productivity; climate related factors. **SNK:** hybrid. Baseline methodology; 1) Describe current land use and occurring vegetation, 2) Description / determination of soil type (the latest version of the 'National soil map' can be used for this purpose), 3) Description of expected development in the project area (e.g., both planned/manmade developments linked to spatial and management plans, and expected natural developments). **EVA:** Parameters from German forest inventory data. Input parameters regionalized models subject to ground truthing via 3rd party auditors. Hybrid baseline, quantified via different approaches: common practices, historical developments, management plans, natural succession or legal provisions. Model is based on same regionalized tree specific growth models as project scenario.

	Gold Standard: Project-specific baseline: determined by estimating the 'tree' and 'non-tree' biomass that is present in the eligible planting area prior to the planting start. **Zertiforest:** Scanning of forest biomass by drone flights before (baseline) and during project. Nationally generated growth model of forests is applied based on scientific studies. Hybrid baseline: determined by activity based digitalization of forest. The baseline scenario determined by scientific studies and statistically generated model for forest growth Addressing uncertainties / indirect emissions based on ISO 14064-2 The calculations are based on long term studies of forest growth and forest carbon binding models based on these studies. The determination of the baseline could depend on the activity. For afforestation and reforestation, before the activity starts, the baseline should be determined for soil organic carbon (SOC), as an activity can have an effect on this, for example. This will also (probably) be the only carbon stock which will be evaluated at the activity start as the other carbon pools (above/below ground biomass, DOM) will probably not have any significant stocks before the start of the activity. Similarly, another more simplified option to consider could be to assume a baseline of "0" when looking at the flux of carbon pools because an equilibrium could be present. For forest management, all the carbon stocks need to be carefully assessed. The baseline-settings should preferably be determined in the same way as the quantification of the carbon removal. Next to this the predictions of the baseline whether ex-ante or an ex-post method is used, need to be made. Predictions of the growth of the forest under the changed management needs to be assessed compared to a baseline growth situation.	
Key Questions	How long should the pre-project reference period for setting the activity specific baseline be? In order to ensure a certain level of consistency in the approach between project-specific and standardised baselines, would it be relevant to prescribe a set of standard methods/tools to assess/calculate the net carbon removal benefit?	
Options	Pros	Cons
Option A: Take a separate sample/reference plot outside the project which is representative for the project to determine baseline setting.	• Have a real baseline location to re-measure.	• Need to ensure other variables (covariates e.g. growing conditions) are the same as the activity plot. • Need to ensure the plot doesn't get transformed or converted (management/ deforestation)
Option B: Use model/yield data to predict baseline	• See beforehand different scenarios	• There are many different forest resource models. Deciding which ones are the most appropriate for

scenario for forest management activities.		different activities would require further consideration.
Overarching questions		
Short pre-project (Af/Re-forestation)	• Can be assessed shortly before activity starts.	• Might fail to capture/miss previous carbon stock changes/losses before the activity start.
Assume a baseline of "0" for activities such as reforestation/afforestation when looking at carbon fluxes.	• Easy to assess. • Simple approach that would limit administrative burden	• Might miss carbon losses from previous land-use. • Overestimation of first assessment of carbon stocks.
Preliminary findings	General consensus: Only in case of afforestation a pre-activity period is relevant, where the previous land use should be leading. In regard to changing forest management practices, current practice in each country of predicting growth (forest resource models for example) should be used. General comments: - Only in case of afforestation an historic baseline is relevant. In case of forest management, an approach similar to Forest Reference Level (FRL) (from the LULUCF Regulation) would be relevant taking into account current management. - The models currently used in different countries to predict growth should be use to assess the baseline. The use of a twin forest (to compare plots) will be very uncertain and is very costly. Rather use the tools forest owners already use in their practice.	
Open questions	How long should the pre-project reference period for setting the activity specific baseline be? In order to ensure a certain level of consistency in the approach between project-specific and standardised baselines, would it be relevant to prescribe a set of standard methods/tools to assess/calculate the net carbon removal benefit?	
Next steps	Develop method for activity specific baseline.	

3.5. Quantification of uncertainty

Definition	From annex I: (f) rules to address uncertainties in the quantification of carbon removals referred to in Article 4(8): 8. The quantification of permanent carbon removals, temporary carbon removals from carbon farming and carbon storage in products, and soil emission reductions shall account for uncertainties in a conservative manner and in accordance with recognised statistical approaches.

	Uncertainties in the quantification of carbon removals and soil emission reductions shall be duly reported.	
Issue	The quantification of removals should be based on a robust approach and provide reliable outcomes. Ideally the quantification should therefore be accompanied by an uncertainty estimate to provide confidence in the measured or calculated carbon removals. Quantification of uncertainty depends on the quantification approach, for every quantification approach uncertainties are present.	
Objective	Clear rules on how a robust assessment can be made of the uncertainties resulting from the quantification the carbon removal activity.	
Existing certification methodologies	**Verra:** uncertainty by quantifying sample error and addressing measurement error through QA/QC procedures. **EVA:** methodologies follow a conservative approach, overestimation baseline and underestimation of project gains **Zertiforest:** Addressing uncertainties / indirect emissions based on ISO 14064-2. Others do not mention uncertainty.	
Key questions	Should statistical uncertainty be quantified for the certification or should the methodology only have a mechanism to deal with uncertainty, e.g. discounting? If yes, at what level should the uncertainty be quantified, for the group of operators or for an individual activity?	
Options	Pros	Cons
Explicit quantification of statistical uncertainty	• Provides more insight in the certainty of the quantified carbon removals • Uncertainty quantification is also required for reporting following GHG protocol	• Difficult to calculate as required data (e.g. probably distributions) are often not available • Additional administrative burden • Requires highly skilled intermediaries
Generic approach for dealing with statistical uncertainty without explicit quantification (e.g., program-wide risk sharing)	• Much simpler approach and therefore lower costs • More transparent • Would make more sense when using a standardised baseline approach	• Higher risk of under- or overestimating carbon removals • Maybe not sufficient to comply with GHG protocol criteria
Preliminary findings	General consensus: No clear consensus. However, discounting may be a good approach to manage uncertainties, whereby cost-effectiveness needs to be considered.	

Open questions	Should statistical uncertainty be quantified for the certification or should the methodology only have a mechanism to deal with uncertainty, e.g. discounting? If yes, at what level should the uncertainty be quantified, for the group of operators or for an individual activity?
Next steps	Further develop insight in uncertainty calculation/quantification.

3.6 Feedback from Expert Group on Quantification topics

Among many experts there was a clear preference for a hybrid quantification approach for carbon stock changes, which would include a combination of modelling, remote sensing, and in-situ measurements. The Biomass Expansion Factors (BEF) should be country-specific or based on regional default values provided at certification scheme level.

Experts had different views on how to address indirect emissions due to land use change (ILUC). Some stated that the delegated act should at least identify activities that are most problematic for leakages and proposed a method to take ILUC into account, preferably by discounting. Others argued that it is impossible for operators to know whether carbon sequestration operation will cause land use change elsewhere.

Experts also had different views on how to deal with uncertainty. Some preferred to set up rules for discounting, whereas others were in favour of quantifying uncertainty.
Some experts underscored the importance of rewarding early movers, activity-based finance, and contribution claims.

4. Additionality

4.1. Introduction

The rationale of the provisional agreement on the CRCF regulation is that operators will adopt new and additional, improved forestry practices to achieve verifiable emission reductions or removal of greenhouse gases. The certification therefore applies to additional efforts by the operator and is not intended for activities that would have taken place in a business-as-usual scenario, for example because a certain activity is already happening, financed by a third party or required by law or national policy.

To ensure that the Union certification framework channels incentives toward carbon removals that go beyond the standard practice, carbon removal activities should be additional and must represent a real and additional reduction or removal of emissions compared to what would have happened in the baseline scenario.

Additionality rules must also consider whether the operator is already rewarded for the same activity through other financial arrangements from the EU or national governments or whether additional rewarding via carbon certificates is needed to make the activity financially viable. In other words, carbon removal activities should take place due to the incentive effect provided by the certification, that make it possible to cover the cost of implementation.

An important consideration in the carbon methodologies' debate, in particular in talks around Art 6.4 of the Paris Agreement, is the promise by countries that climate ambition should progress over time, to stay in line with 1.5 degrees. That means that additionality should be compared to a dynamic baseline, upgrade the baseline regularly, or allow future discounting. If for example a strengthening of policies is foreseen, this should be taken into consideration.

In case of an activity that performs better than the standardised baseline, the additionality criteria are considered to be complied with. Therefore, the additionality criteria regarding regulatory and financial additionality are only relevant in case an activity-specific baseline is used.

4.2. Additionality rules in case of an activity-specific baseline

Definition	Any activity shall be additional. To that end, it shall meet both of the following criteria: (a) it goes beyond Union and national statutory requirements at the level of an individual operator; (b) the incentive effect of the certification is needed for the activity to become financially viable. Where the standardised baseline established pursuant to Article 4(5) or (5a) is used, additionality as referred to in paragraph 1 is considered to be complied with. Where the activity-specific baseline is used, additionality

	as referred to in paragraph 1, points (a) and (b), shall be demonstrated through specific additionality tests in accordance with the applicable certification methodologies set out in the delegated acts adopted pursuant to Article 8. *Related to Annex I: (g) rules to carry out the specific additionality tests referred to in Article 5(2)*
Issue	In order to assess the additionality of an activity, it is necessary to set rules on how to test this. This can comprise several aspects of additionality: • Regulatory additionality (i.e., carbon farming practice should go beyond current obligatory practices) • Financial additionality (i.e., carbon farming practice should be implemented as results of the financial incentive from the carbon certificates) Rules regarding regulatory additionality are more straight forward compared to financial additionality, as the activity should go beyond what is the minimum requires by European, national and regional legislation or policy. Still there can be a need to discuss rules regarding relevant policy like agreements between farmer organisations and the government or provinces that oblige to activities for other reasons. The provisional agreement on the CRCF regulation states that the incentive effect of the certification is needed for the carbon farming activity to become financially viable. The methodology should further clarify which rules are required. For financial additionality there are different approaches available and currently no clear EU rules are existing on this topic.
Objective	Set rules to carry out a specific additionality test.
Existing certification methodologies	Most methodologies ensure that the project should not be common practice (e.g. VERRA, SNK and EVA) in order to be considered additional. Regulatory additionality is needed for all methodologies, financial for most (9) methodologies. Some methodologies also revaluate what is common practice to shift the baseline used for calculating the additionality (e.g. ECS Climate Forest or VERRA) or do not revaluate the baseline (e.g. SNK). Some methodologies also require a specific reporting or test to show additionality (e.g. Zertiforest or FSC). **Verra:** Additionality is demonstrated through a performance benchmark or project method. Investment barriers must be demonstrated, and the project activity must not be common practice without carbon finance. The geographic domain is identified, and a representative sample is surveyed to calculate the percent adoption of the project activity not financed with carbon revenue. If the percentage adoption is below 15%, the project

	activity is deemed not common practice and is additional. Relevant government statistics may be used as an alternative, provided they are derived from data collected within 5 years of the project's start date. **Silvaconsult:** Regulatory additionality: additionality is examined in accordance with the CLEAN DEVELOPMENT MECHANISM TOOL01 Tool for the demonstration and assessment of additionality Version 07.0.0. The additionality of the projects lies in the voluntary commitment made by a forest owner to reduce forest use and thus increase the amount of stored wood. The alternative to the project is to not make any commitment. **EVA:** Regulatory additionality: based on the question if the government is on-track in terms of meeting its science-based UN climate goals with governmental tools (e.g. law enforcement, substitutions, etc. currently not the case. As long as the scientifically required conversion rate (of 95,000 ha/year) is not achieved through the legal framework alone, projects that accelerate the implementation towards climate-resilient forests in Germany will be recognized as "regulatory additional" under the German FCS. **Gold Standard:** "Shall apply the latest version of the the A/R CDM[18] 'Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities'. The CDM specific terms of the A/R CDM additionality tool (tCERs, A/R CDM project, etc.) shall be interpreted in the context of Gold Standard. The 'Guideline on the assessment of investment analysis' and the 'Guidelines for objective demonstration and assessment of barriers' can be used. Gold Standard also provides a 'Positive List'; and if the project meets the requirements mentioned in the positive list; it is deemed eligible. " **Zertiforest:** ISO 14064-2 itself does not address additionality. However, it requires that the project operator demonstrates how the additionality is/has been reached. ISO 14064-2 requires that claimed additionality must be demonstrated in a reliable and trackable way.	
Key questions	Which aspects would be relevant to consider when assessing co-funding with public support, e.g. national subsidies for planting trees, nature restoration or nature forest management, etc? Which approach should be used for demonstrating financial additionality? ○ Financial attractiveness test ○ Other Would it be relevant to demonstrate that a project activity is not common practice (e.g. not more than 20% in a region), similar to other crediting schemes? Would a threshold of 20% be appropriate?	
Options	Pros	Cons

[18] https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-02-v1.pdf

Option A: Use the CDM "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities'	• Already applied by different methodologies.	• Only for af/re-forestation • Might not be appropriate to sufficiently assess additionality in an EU context in line with the requirements of the regulation
Option B: Use ISO 14064-2	• Already applied by different methodologies.	• Does not define additionality, it only requires that the project operator demonstrates how additionality is/has been reached
Should a specific percentage for adoption be set to determine additionality?	• Clear rules on when an activity/the result of the activity is additional or not.	• Might differ per country when adaptation is large or not. E.g. 15% might be a lot in one country and not so much in another.
Common practice test (see also previous point)	• Probably results in more effective use of money for carbon farming practices • More innovative practices are stimulated	• Data to demonstrate this might be not easily available or scarce • Although a certain practice might be considered a common practice, there might be barriers to other forest owners that have not implement it and carbon certificates might overcome that (financial) barrier, thus creating an incentive effect
Add a financial attractiveness test to existing legal tests to assess additionality	• The perception that a financial arrangement (subsidy, certification) is not financially interesting often becomes apparent after ending the arrangement. With this option you can tailor the financial arrangement in order to increase the attractiveness for the operator	• A large group of operators might be left out, with also a GHG reduction potential, who face greater uncertainties and who want to try something unusual/innovative to achieve emission reductions.
Preliminary findings	General consensus: the focus group discussion focused on the notion of additionality in general and did not come to any conclusion on the key questions listed above. General comments: - Many projects across the EU are partly funded by public funds. In Label Bas Carbone, the limit is set at below 50% of public funding to be eligible.	

	- How to promote early movers in the context of demanding/stringent additionality? E.g. if carbon farming practices have been introduced before entering into the carbon removal certification framework. If this remains unclear landowners/managers might wait until the scheme is launched before taking action.
Open questions	Which aspects would be relevant to consider when assessing co-funding with public support, e.g. national subsidies for planting trees, nature restoration or nature forest management, etc? Which approach should be used for demonstrating financial additionality? ○ Financial attractiveness test ○ Other Would it be relevant to demonstrate that a project activity is not common practice (e.g. not more than 20% in a region), similar to other crediting schemes? Would a threshold of 20% be appropriate?
Next steps	Continue discussion on defining and quantifying additionality for forestry activities.

5. Storage, monitoring and liability

5.1 Introduction

Article 6 of the provisional agreement on the regulation states that an operator or group of operators shall demonstrate that an activity stores the carbon permanently or aims to store the carbon over the long-term. For the long-term storage criteria four aspects have to be defined in the methodology: i) the activity period, ii) the monitoring period, iii) the monitoring requirements and iv) the rules for liability mechanisms. The discussion at the focus group meeting was focussed on the activity and monitoring periods and the liability mechanisms.

In the recently agreed version of the CRCF proposal a distinction is made between carbon removal activities and carbon farming practices are seen as temporary carbon storage. This is a recognition that many biogenic carbon removals cannot be considered permanent, as risk on reversal is higher and there will be saturation of the storage. However, temporary carbon removal still contributes to lowering peak warming, as shown by Matthews et al. (2022).

The provisionally agreed text of the Regulation introduced an explicit differentiation between the activity period and the monitoring period. The 'activity period' is defined as the period over which the activity generates a net benefit, and whose length is determined in the applicable certification methodology.

The monitoring period is the period over which the storage of carbon is monitored by the operator. During the activity, units are created which have a certain period of validity (temporary carbon removal units). The monitoring should ensure that the carbon remains stored during and after the activity. For example, a forest activity happens from 2025 to 2035 and the monitoring period lasts 20 years (i.e., 10 years beyond the activity period); the carbon removal units are therefore valid until 2045. Hence monitoring has to continue at least until 2045 to ensure that the carbon sequestered by the activity in 2025-2035 is still stored. But no new units will be created between 2035 and 2045.

5.2. Minimum duration of the activity period

Definition	The 'activity period' is defined as the period over which the activity generates a net benefit, and whose length is determined in the applicable certification methodology. For carbon farming activities, the activity period should last at least 5 years. *Related to Annex I (a) type of activity and description of the practices and processes covered, including its activity period and monitoring period*
Issue	Activity periods can differ for different forest activities. Afforestation is very intensive in the beginning with the preparation of the plot and the planting of the trees. Probably after planting, some management will occur but that is not necessarily needed for a forest to grow and store carbon.
Objective	A minimum duration of the activity period that ensures contribution to long term storage of carbon in forest pools, but which is also acceptable to foresters to engage in carbon farming certification schemes.

	The CRCF provisional agreement states that an operator or group of operators shall demonstrate that an activity stores the carbon permanently or aims to store the carbon over the long-term.
Existing certification methodologies	In the survey on existing methodologies, there was a question on the duration of the certification period, which can be considered similar to the activity period. **Label bas carbone:** Monitoring period: lasts 5 years, from the start of the reforestation project until the audit, which is the only planned verification of the actual carbon storage achieved. Certification period: 30 years **Verra: minimum** 20 years for monitoring and crediting period. Renewable up to 4 times: 100 years. Specifies minimum criteria for spatial and temporal resolution. **FSC Ecosystem Service Procedure:** Carbon storage monitored annually according to duration forest management certificate. In-depth audits every 5 years or whenever new measurements, impacts, or changes to the methodology are proposed. Annual field audits address significant changes in stored carbon, both positive and negative. **Silvaconsult:** Monitoring for adapted forest management for 30 years. Certification for adapted forest management 30 years for forest reserves 50 years. **SNK:** Monitoring period is aligned with project duration. Project owner commits to conservation of trees for a period of 50 years. Certification process includes 1) verification of project implementation – no later than 2 years after start date; 2) verification of effectiveness – no later than 6 years after start date; 3) verification of C-build up in new forest, tree meadow, tree row - parts 2 and 3 have to be done minimally once each 12 years. **EVA:** Monitoring and crediting period is related. For reforestation periods ranging from 20-30 years. **Gold Standard:** Minimum is 30 years and maximum is 50 years. Special condition for mangroves for a minimum 20 years period as well. **Spanish carbon footprint registry:** At least 30 years, maximum 50 years. Certified removals are generated at any time that they occur during the monitoring period (30-50 years). A code is given to every CO2 ton of certified removal indicating the year in which it was generated. **Zertiforest:** as long as the forest grows (as per ISO 14064-2), or minimum 40 years. Project operator argues for storing the carbon in long term wood-products after the end of the CO2-binding project. **ECS Climate forest:** Mon. period 30 years minimum. Certification period 30 years.

	Woodland carbon code: Projects should be reviewed at year 5 and then at least every 10 years after the project start date (for single projects) or the group start date (for groups). Woodland Carbon Guarantee ('WCaG') contracts will only cover carbon sequestered for the first 30-35 years of the woodland's life. The actual contract length will be determined by the starting year with all contracts ending in 2055/6. Projects or group schemes must be regularly monitored and either third party verified or Self-Assessed at least at year 5 and then every ten years by an independent validation/verification body. Certification periods range from 30 years (e.g. Label Bas Carbone, SILVACONSULT, Gold standard and ECS) to 100 years after renewing a 20 year certification period (e.g. VERRA) or let it be dependent on the time a certain type of management is applied (e.g. FSC or SNK). Most methodologies require monitoring of carbon stocks during the certification project ranging from yearly (e.g. FSC) to 5 year intervals (e.g. EVA) or 10/12 years interval (e.g. Woodland Carbon code or SNK). Label Bas Carbone monitors the first 5 years after which a field verification is done and the monitoring stops.	
Key questions	- Should the activity period and monitoring period be the same? - Should every forestry carbon removal activity have its own minimum activity period? - What should be the minimum activity period per activity?	
Options	Pros	Cons
Monitoring period should be the same as the activity period	• Current certification methods do not differentiate between activity and monitoring period.	• Carbon removal units are only valid when an activity is happening.
Monitoring period can be longer than the activity period in order to match the validity of the carbon removal unit.	• A longer monitoring period will ensure a more longer term storage of the carbon in the soil and/or biomass.	• Monitoring can be costly, especially if it cannot be done through remote sensing. Who will pay for this extra cost? • Legally more complex, who is responsible for possible reversal after the activity period?
Every forest activity should have its own (minimum) activity period (five years or longer)	• Tailor made periods for different carbon removal activities. • Activity length can differ per activity.	• There are different periods for every activity which could make things complicated.
Preliminary findings	General consensus: 1. No, there should be different activity and monitoring periods. Monitoring periods should be longer than the activity period. 2. Yes, every forest carbon removal activity should have its own minimum activity period. This should also be location-specific (depending e.g. on the growing conditions, the activity period can be shorter for fast growing forests and should be longer for slower growing systems).	

	General comments: - The duration of the activity period should be project and location specific in order to be able to take into consideration for instance activity type and growing conditions. - In current voluntary forest carbon certification, the terms activity and monitoring period are not used at all. Instead, a crediting period is used, which appears to be similar to the concept of activity period. - There was also a need for further clarification about the differences between monitoring and crediting periods. The crediting period would be something between the issuer of the credits and the crediting scheme and would probably fall outside the scope of the EU framework. - A forest owner may have no incentive for further action if the monitoring period is different from the crediting period in the certification scheme – or should certification schemes change their crediting period in order to be compliant with the EU carbon removal framework? - In case of ex-post credits, a five year period would be credible and acceptable for forest owners. If activity periods are longer (i.e. the time until carbon credits can be issued) this will likely not attract many forest owners to certify carbon removals. If there will be a theoretically set long activity period it is likely nobody will apply for such credits. Note afterwards: Minimum activity period is now set at 5 years in CRCF's provisional agreement.
Next steps	Make a clear definition for activity period for forestry activities.

5.3. Minimum duration of the monitoring period

Definition	'monitoring period' means a period over which the soil emission reduction or storage of carbon is monitored by an operator or a group of operators and which covers at least the activity period as determined in the applicable certification methodology; *Related to Annex I (a) type of activity and description of the practices and processes covered, including its activity period and monitoring period;*
Issue	Article 6(3) states: *"The carbon removed and subsequently stored by a carbon removal activity shall be considered released to the atmosphere at the end of the monitoring period, unless that monitoring period is prolonged through a new certification of the activity or the carbon is stored permanently pursuant to paragraph 2a, points (a) and (b), and paragraph 2b, points (a) and (b).."* This implies the monitoring period can be longer than the activity period. Only when the monitoring stops the carbon removed shall be considered released back to the atmosphere.

Objective	A minimum duration of the monitoring period that ensures contribution to long term storage of carbon in soils and/or biomass, but which is also acceptable to landowners to engage in carbon farming certification programmes.
Existing certification methodologies	**Label bas carbone:** Monitoring period: lasts 5 years, from the start of the reforestation project until the audit, which is the only planned verification of the actual carbon storage achieved. Certification period: 30 years **Verra:** 20 years for monitoring and crediting period. Renewable up to 4 times: 100 years. Specifies minimum criteria for spatial and temporal resolution. **FSC Ecosystem Service Procedure:** Carbon storage monitored annually according to duration forest management certificate. In-depth audits every 5 years or whenever new measurements, impacts, or changes to the methodology are proposed. Annual field audits address significant changes in stored carbon, both positive and negative. **Silvaconsult:** Monitoring for adapted forest management for 30 years. Certification for adapted forest management 30 years for forest reserves 50 years. **SNK:** Monitoring period is aligned with project duration. Project owner commits to conservation of trees for a period of 50 years. Certification process includes 1) verification of project implementation – no later than 2 years after start date; 2) verification of effectiveness – no later than 6 years after start date; 3) verification of C-build up in new forest, tree meadow, tree row - parts 2 and 3 have to be done minimally once each 12 years. **EVA:** Monitoring and crediting period is related. For reforestation periods ranging from 20-30 years. **Gold Standard:** Minimum is 30 years and maximum is 50 years. Special condition for mangroves for a minimum 20 years period as well. **Spanish carbon footprint registry:** At least 30 years, maximum 50 years. Certified removals are generated at any time that they occur during the monitoring period (30-50 years). A code is given to every CO2 ton of certified removal indicating the year in which it was generated. **Zertiforest:** as long as the forest grows (as per ISO 14064-2), or minimum 40 years. Project operator argues for storing the carbon in long term wood-products after the end of the CO2-binding project. **ECS Climate forest:** Mon. period 30 years minimum. Certification period 30 years. **Woodland carbon code:** Projects should be reviewed at year 5 and then at least every 10 years after the project start date (for single projects) or the group start date (for groups). Woodland Carbon Guarantee ('WCaG') contracts will only cover carbon sequestered for the first 30-35 years of the woodland's life. The actual contract length will be determined by the starting year with all

	contracts ending in 2055/6. Projects or group schemes must be regularly monitored and either third party verified or Self-Assessed at least at year 5 and then every ten years by an independent validation/verification body. Certification periods range from 30 years (e.g. Label Bas Carbone, SILVACONSULT, Gold standard and ECS) to 100 years after renewing a 20 year certification period (e.g. VERRA) or let it be dependent on the time a certain type of management is applied (e.g. FSC or SNK). Most methodologies require monitoring of carbon stocks during the certification project ranging from yearly (e.g. FSC) to 5 year intervals (e.g. EVA) or 10/12 years interval (e.g. Woodland Carbon code or SNK). Label Bas Carbone monitors the first 5 years after which a field verification is done and the monitoring stops.	
Key questions	- Should every forestry carbon removal activity have its own minimum monitoring period? - What should be the minimum monitoring period per activity?	
Options	Pros	Cons
Should every carbon removal activity have its own minimum monitoring period?	• Tailor made periods per removal activity.	
Preliminary findings	See summary at 5.2. As there was no further discussion specifically for the monitoring period. Regarding the minimum monitoring period and how often should be monitored it was agreed that this should be specific for the activity and growing conditions.	
Open questions	- Should every forestry carbon removal activity have its own minimum monitoring period? - What should be the minimum monitoring period per activity?	
Next steps	Further define monitoring periods for forestry activities.	

5.4. Rules for liability mechanisms

Definition	An operator or group of operators shall be liable to address any reversal of the carbon captured and stored by an activity, occurring during the monitoring period, through appropriate liability mechanisms. The liability mechanism shall: for carbon storage in long lasting products and for carbon farming, be set out and duly justified in the applicable certification methodology and may include up-front insurance or collective buffers. *Related to Annex I (i) rules on appropriate liability mechanisms referred to in Article 6(2), point (b) and Article 6(2b), including rules on the risk of failure of the relevant liability mechanism;*

Issue	Recital 14: "In addition to measures taken to minimise the risk of carbon release into the atmosphere during the monitoring period, appropriate liability mechanisms should be introduced to address cases of reversal. The certification methodologies should also include rules on the risk of failure of the liability mechanisms. Such mechanisms could include collective buffers and up-front insurance mechanisms. In order to avoid double regulation, liability mechanisms in respect of geological storage and CO2 leakage, and relevant corrective measures laid down by Directive 2003/87/EC and Directive 2009/31/EC of the European Parliament and of the Council1 should apply. In addition, to ensure regulatory consistency, the relevant certification methodologies should include monitoring rules and liability mechanisms which are consistent with the rules concerning permanently chemically bound carbon products pursuant to Directive 2003/87/EC." For carbon farming activities there are many examples of liability mechanisms from national or private certification schemes that can be considered for the CRCF methodologies.
Objective	The development of appropriate liability mechanisms to cover for the case in which carbon is released into the atmosphere during the monitoring period. The following mechanisms were the main ones considered: • Discounting of carbon removal units • Collective buffers of carbon removal units • Up-front insurance mechanisms
Existing certification methodologies	**In a buffer pool approach** a certain percentage of the removal units issued is kept separately in 'pool', which can be shared with other activities or can be used within the activity when certain removal units cannot be issued or are cancelled due to unforeseen (climate) impacts. If the buffer is not used, the certificates can be assigned to the farmers at the end of the activity or monitoring period. **In a discount based approach** a certain percentage of calculated/estimated carbon removals is excluded from carbon certification, which compensates for the uncertainty and potential risk on reversal. This amount is not made available for certification after the activity or monitoring period. **In an insurance based** approach, the operator ensures that additional certificates can be bought to compensate in case of carbon losses during the activity or monitoring period. Most methodologies take a buffer into account (e.g. SNK, FSC and VERRA), ranging from 10% (e.g. Label Bas Carbone) to 25% (e.g. ECS), to mitigate the risk of non-permanence due to natural disturbances (e.g. wind or fire). These buffers are sometimes put in a bank or pool (e.g. FSC, VERRA and EVA). The buffers can be used in other projects to cover losses of carbon due to disturbances. Also, sometimes high fire risks sites are avoided (e.g. EVA) and climate resilient tree species are used (e.g. EVA and ECS) to mitigate the effect of climate change. ECS lets project partners pay for lost carbon when this occurs due to negligence.

Key questions	Which liability mechanism is most appropriate for forestry activities?	
Options	Pros	Cons
Discounting	• More certainty that the units correspond to actual carbon removals	• Less incentive for foresters to maintain their practices, as there is no final payment
Buffer pool	• More attractive for land owners as it can serve as a bonus for maintaining their practices • Most existing methodologies use this approach	• If the buffer is paid out after the monitoring period, there is less certainty
Insurance	• Liability is for the buyer and not for the farmer • Insurance company would be an independent third party	• More uncertain whether new carbon certificates can be purchased if required in case of a carbon release.
Preliminary findings	General consensus: Most focus group members agree that the buffer method may be the preferred option as it best meets the forest owner's needs. General comments: - The buffer method is the most attractive for foresters and it is also the most widely used approach among currently existing carbon certification methods. - It was indicated that it would be relevant to have further information on what the units can be used for and if and for what offsetting purposes they can be used. For offsetting, stricter liability mechanisms should be mandatory. A buffer is not required for merely reporting the status of carbon on the forest owner's own land, as a buffer is a market integrity instrument(not a reporting quality instrument). - There should be an incentive for continued monitoring, for instance by storing a buffer of carbon removal benefits, only to be released at the end of the monitoring period.	
Next steps	Further develop method for liability mechanisms for insurance and buffer pool for forestry activities.	

5.5 Feedback from Expert Group on liability topics

Most experts were either in favour of a buffer pool or a discount mechanism or a combination of these liability measures. When opting for a buffer pool mechanism, it was highlighted that it needs to be well-supervised in terms of stress tests, its composition and the rules governing its supply. According to an expert the buffer pool should represent an important part of the credit, in order to provide incentives for long-term storage, and include a backstop-mechanism. When

opting for a discount mechanism, experts stressed that it needs to be extremely strict if the units are to be used to compensate for emissions.

6. Sustainability

6.1 Introduction

Carbon removal activities must preserve or contribute to sustainability objectives such as climate change adaptation, circular economy, water and marine resources, and biodiversity. Carbon removal activities have a strong potential to deliver win-win solutions for sustainability, even if trade-offs cannot be excluded. Therefore, it is appropriate to establish minimum sustainability requirements to ensure that carbon removal activities have a neutral impact or generate co-benefits for the sustainability objectives of climate change mitigation and adaptation, the protection and restoration of biodiversity and ecosystems, the sustainable use and protection of water and marine resources, the transition to a circular economy, and pollution prevention and control.

In the recent (provisional) agreement on the CRCF framework, the co-legislators have added indications on how the sustainability objectives must be understood and have included that a carbon farming activity must always generate at least a biodiversity co-benefit (including soil health and avoidance of land degradation).

6.2. Minimum sustainability requirements

Definition[19]	The CRCF provisional agreement states that an activity shall not significantly harm and may generate co-benefits for one or more of, the following sustainability objectives: a) climate change mitigation beyond the net carbon removal benefit and net soil emission reduction benefit b) climate change adaptation; c) sustainable use and protection of water and marine resources; d) transition to a circular economy, including the efficient use of sustainably sourced bio-based materials; e) pollution prevention and control; f) protection and restoration of biodiversity and ecosystems including soil health, as well as avoidance of land degradation. g) With regard to this last objective, the generation of co-benefits is required by the CRCF agreement for carbon farming activities to at least generate co-benefits for the sustainability objective . An activity shall comply with minimum sustainability requirements laid down in the certification methodologies and the minimum sustainability requirements shall take into account the impacts both within and outside the Union and local conditions. Those minimum sustainability requirements shall, where appropriate, be consistent with the technical screening criteria for the 'do no significant harm' principle. The minimum sustainability requirements shall promote the sustainability of forest and agriculture biomass raw material in accordance with the sustainability and GHG saving criteria for biofuels,

[19] The definition of article 7 regarding sustainability has changed since the first CRCF proposal was published, shown here is the article as written in the provisional agreement. This technical assessment paper and the discussion explained in it is based on the CRCF proposal so some points might be outdated a bit compared to the provisional agreement of the CRCF.

	bioliquids and biomass fuels laid down in Article 29 of Directive (EU) 2018/2001. *Related to Annex I (j) rules on the minimum sustainability requirements referred to in Article 7(2)*
Issue	The specific criteria and indicators for these minimum sustainability requirements are to be laid down in the certification methodologies. There is a need for reliable and possibly quantifiable criteria to assess whether activities have a neutral impact on the sustainability objectives.
Objective	A reliable set of criteria and a list of indicators for assessing sustainability requirements for carbon farming activities.
Existing certification methodologies	Most reviewed methodologies specify a "no harm" principle (e.g. VERRA, Zertiforest and SNK) on other environmental objectives e.g. climate, soil, community/culture (e.g. Label Bas Carbone), biodiversity (e.g. VERRA, FSC, ESC) or sustainable development goals (e.g. VERRA and Gold Standard). Also, most methodologies need to report on potential co-benefits or trade-offs (e.g. Label Bas Carbone, VERRA, SILVACONSULT, Gold standard and Woodland Carbon code). Label Bas Carbone specifies that certain practices are forbidden and has a system to account for co-benefits. But specific measurements are not mentioned and how to assess them. The EU Taxonomy is the EU's sustainable finance framework for sustainable economic activities[20]. Business activities must satisfy technical screening criteria and Do No Significant Harm (DNSH) criteria to be evaluated for their contribution to, or their no harm on, one of the six objectives: o Climate change mitigation o Climate change adaptation o The sustainable use and protection of water and marine resources o The transition to a circular economy o Pollution prevention and control o The protection and restoration of biodiversity and ecosystems These objectives build the basis for the sustainability criteria in the CRCF article 7(1), and therefore the DNSH screening criteria in the Taxonomy Delegated Acts are explicitly referred to in for consistency purposes for the minimum sustainability requirements, where relevant. The CRCF provisional agreement goes further by stating that an activity should create co-benefits for the protection and restoration of biodiversity and ecosystems including soil health and land degradation. **Label bas carbone:** Some practices are forbidden. Furthermore, there is a system of co-benefits accounting (bonus) about 4 topics: socio-economic, preservation of soils, biodiversity and water.

[20] https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en

	Verra: Requirements related to safeguards to ensure that the certified activities do not harm other environmental objectives. Requirement of project proponent to identify potential negative environmental and socio-economic impacts and take steps to mitigate them. Projects can seek certification under the Climate, Community & Biodiversity Program or the Sustainable Development Verified Impact Standard Program to demonstrate their contribution towards achieving other environmental and social objectives beyond carbon reductions. **FSC Ecosystem Service Procedure:** The FSC Ecosystem Service Procedure has specific management requirements and eligibility criteria to minimize or eliminate the risk of trade-offs with other environmental objectives **Silvaconsult:** Certification according to a recognised standard such as PEFC, FSC or an equivalent procedure can also be used as evidence of environmental and social compatibility. Co-benefits (e.g. biodiversity) are specified and reported. **SNK:** no environmental harm only indirectly: Soil C stocks should be preserved, only max 10% of land surface may be disturbed, etc. So any significant negative land use/management change impacts are mitigated. **EVA:** In a few aspects the German FCS goes beyond the requirements of PEFC and FSC; e.g. with its requirements of minimum 3 tree species and the silviculture objective of a climate resilient forest. Minimum of 3 tree species are also monitored throughout the crediting period through the certification scheme **Gold Standard:** All Gold Standard projects have to adhere to the Principles and Requirements, which includes social and environmental safeguards. **Spanish carbon footprint registry:** It is up to the operators to indicate if it the project/activity brings additional co-benefits, in which case, related information must be presented in order to be able to confirm/assess that info by the scheme operator. **Zertiforest:** There are general strict laws for NOT harming preserved nature types and forests. Private forestation is already heavily regulated and preservable nature types are well under preservation by laws and authorities. Finland has well known laws and regulations to preserve environmental values in Finnish forests. Thus the additional environmental values can be easily included in carbon binding projects in Finland. **ECS Climate forest:** Strict rules on leakage focus on increase of biodiversity. **Woodland carbon code:** Projects shall demonstrate whether or not an Environmental Statement/EIA Report is required under the Environmental Impact Assessment Forestry Regulations.
Key questions	Which approach should be used to define and assess compliance with the minimum sustainability requirements? A positive list of practices, quantification of indicators, literature, other?

	a) Which indicators should be used for each of the sustainability objectives? b) Should a list of no harm activities be made?	
Options	Pros	Cons
Qualitative assessment based on literature/experts	• Less administrative burden • In line with most existing methodologies • No additional development of assessment framework required	• Requires funding of training and advisory services to do proper sustainability assessments • More subjective approach
Positive/negative list of carbon farming practices	• Easy to apply • Low-cost option	• Effects of most practices are context specific, e.g. depending on soil type and forest management. If scientific studies are used as a basis, then it may need adaptation to local conditions • Not all practices will always have a positive or neutral impact on all sustainability requirements, many practices might be excluded • Not in line with a results based approach
Preliminary findings	General consensus: There was no clear consensus on the key question. However, the group appeared to converge towards a relatively simple approach with limited transaction costs to incentivize forest owners/managers. The approach should preferably rely on existing certification systems for sustainable forest management like FSC and PEFC. In the EU, the majority of forests are already certified according one of these certification schemes. General comments: - The current sustainability criteria included in the carbon removal certification framework do not include social aspects. If carbon removal activities have negative social impacts, they should not be considered sustainable. - However, there may be an issue with relying on existing certification schemes in case of a standardised baseline, as many forests are already covered by FSC or PEFC certifications which include baselines. Hence it will be difficult to improve compared to this standardised baseline, while at a project-basis the forest owner may improve compared to the (non-certified) starting situation.	
Open questions	Which indicators should be used to quantify protection and restoration of biodiversity and ecosystems including soil health, as well as avoidance of land degradation?	
Next steps	Further develop method for sustainability requirements.	

6.3. Monitoring and reporting of co-benefits

Recital 17 (CRCF): Operators or groups of operators may report co-benefits that contribute to the sustainability objectives beyond the minimum sustainability requirements. To this end, their reporting should comply with the certification methodologies tailored to the different carbon removal activities, developed by the Commission. Certification methodologies should, as much as possible, incentivise the generation of co-benefits for biodiversity going beyond the minimum sustainability requirements. In the recent (provisional) agreement on the CRCF framework this aspect was further strengthened and now states that a carbon farming activity must always generate at least a biodiversity co-benefit (including soil health and avoidance of land degradation).

These additional co-benefits will give more economic value to the certified carbon removals and will result in higher revenues for the operators. In the light of these considerations, it is appropriate for the Commission to prioritise the development of tailored certification methodologies on carbon farming activities that provide significant co-benefits for biodiversity.

Definition	The CRCF proposal (Article 7(3)) states that the certification methodologies shall include elements to incentivise as much as possible the generation of co-benefits going beyond the minimum sustainability requirements, in particular for the biodiversity and ecosystem protection and restoration objective. The methodology should define how these co-benefits should be assessed and monitored. *Related to Annex I (k) rules on the monitoring and reporting of the co-benefits referred to in Article 7(3).*
Issue	Assessing and monitoring the co-benefits is not straightforward and will require further development. For the quantification of biodiversity, ecosystem, soil health and avoidance of land degradation co-benefits, which are mandatory for carbon farming activities in the final framework, there are currently no widely accepted approaches and indicators that could be used, and there are different views on what biodiversity and ecosystem restoration would comprise.
Objective	A reliable cost-effective system to monitor, assess and quantify environmental benefits and co-benefits.
Existing certification methodologies	**Label bas carbone:** Photographs of the plantation, co-benefits documentation (map…), biodiversity survey **Verra:** Project proponent shall provide evidence that project activities do not impact local stakeholders at validation and each verification. **FSC Ecosystem Service Procedure:** verification framework includes five types of ecosystem services - biodiversity, carbon storage and

	sequestration, watershed services, soil conservation, and recreational services - with cultural services to be included in the upcoming revision. **Silvaconsult:** There is no mechanism in the current methodology in place but they are working on better quantification, monitoring and reporting with research institutes. **SNK: -** **EVA: -** **Gold Standard:** GS4GG mandates reporting of at least two SDGs apart from climate action (SDG 13). These are part of the monitoring protocols and have to be reported during monitoring cycles. **Spanish carbon footprint registry: -** **Zertiforest: -** **ECS Climate forest:** Measures to bolster biodiversity are monitored and documented. **Woodland carbon code:** They shall provide: the Environmental Statement/EIA Report if one was required; or other evidence that environmental impacts of the project are likely to be positive if no EIA is required. The validation/verification body will check there is no evidence of non-conformance with the UK Forestry Standard. **European commission:** The INCA Tool (created in the INCA project) is a QGIS plugin to support the calculation of ecosystem services accounts. The methodology implemented in the tool is aligned with the proposed European legislation on ecosystem accounts. Additionally, the tool supports the calculation of two voluntary accounts in line with the global standard of the System of Environmental-Economic Accounts (SEEA EA).	
Key questions	Which methodology could be used to quantify co-benefits? Could a separate methodology/approach be considered for assessing/assuring the mandatory co-benefits for biodiversity, in contrast to methodologies to quantify other co-benefits? How could the sustainability component of the methodologies promote and seek synergies with other relevant EU legislation, such as Water Framework Directive, Birds/Habitat Directives, Nature restoration?	
Options	Pros	Cons
Quantitative assessment based on set of criteria and indicators	• Fits well with a result-based approach • Could be linked to EU and national monitoring	• Currently no applicable / widely accepted set of sustainability criteria and indicators or

	approaches in other environmental fields, e.g. soil health monitoring, forest monitoring, water quality monitoring • Could enable synergies with other relevant EU legislation in addition to the Taxonomy, such as nature restoration law • While the absence of a favoured/standard approach on the current VCM indicates methodologies for quantification of co-benefits would have to be developed, ongoing research projects such as the INCA project could provide relevant insights	specific methodologies for quantifying these • Will increase administrative burden as more data would be require • Might require a modelling framework that is not yet widely applicable
Positive list of carbon farming practices with additional benefits	• Easy to apply for operators of a carbon farming project • In line with most current methodologies and incentives for additional benefits (e.g. national eco-schemes)	• Uncertain whether the practices lead to actual improvements for benefits • An exclusive list of activities might be challenging to define, and would not necessarily take into account potential relevant regional/local circumstances
Preliminary findings	Due to lack of time, this topic was not discussed extensively during the Focus Group Meeting. Participants were asked to provide written input afterwards. One approach which was suggested was the use of a negative list of practices as also mentioned above in the options. Here details need to be written out per activity which practices are allowed and which not in combination with for example the previous land use. Other options mentioned were the use of modelling methods to qualitatively assess the impact of practices for example using the "Index of biodiversity potential[21]" or quantitatively asses using the INCA tool developed by the INCA project.	
Open questions	Which methodology could be used to quantify co-benefits?	

[21] Zeller, L., Baumann, C., Gonin, P., Heidrich, L., Keye, C., Konrad, F., Larrieu, L., Meyer, P., Sennhenn-Reulen, H., Müller, J., Schall, P., Ammer, C., 2022. Index of biodiversity potential (IBP) versus direct species monitoring in temperate forests. Ecological Indicators 136, 108692. https://doi.org/10.1016/j.ecolind.2022.108692

	Could a separate methodology/approach be considered for assessing/assuring the mandatory co-benefits for biodiversity, in contrast to methodologies to quantify other co-benefits? How could the sustainability component of the methodologies promote and seek synergies with other relevant EU legislation, such as Water Framework Directive, Birds/Habitat Directives, Nature restoration?
Next steps	Develop method for monitoring and reporting of sustainability co-benefits.

6.4 Feedback from Expert Group on sustainability topics

In regard to the question of how to address the minimum sustainability criteria, many experts argued in favour of taking already existing methodologies into account, such as FSC and PEFC. One argument that was raised is that these methodologies would already fulfil the DNSH principle and reduce administrative burden.
For the co-benefits some experts advised to align the indicators with international or EU policies, such as the CDB indicators or the EU Taxonomy regulation. On the question of whether to include positive and negative lists, the opinions were rather mixed. On the one hand, it was argued that it would decrease the administrative burden of reporting and give clear guidance. On the other hand, the difficulty of implementation was addressed, as the sustainability assessment of certain practices depends on local conditions. Some experts stressed the importance of quantification of co-benefits instead of lists.

Annex 1 Summary feedback Expert Group on Technical Assessment paper

Summary TAP feedback – Forestry – Eligible activities		
Total contributions: 23 of which 2 sets of responses were similar (so 21 unique responses)		
Options/topic	PRO ARGUMENTS	ARGUMENTS CON/PROBLEMS IDENTIFIED
2.2 Forest definition. 9 responses		
Use the forest definition as provided in Annex II of the LULUCF regulation 2018/841, which is MS specific	**TAP:** **Number of comments in favour: 6** 6 respondents provided a comment in favour for the use of the MS specific definitions from the LULUCF regulation. **Comments/Reasons pro:** ○ CRCF focuses on emissions according GHG-inventories, which makes it important to align with the definition from the EU LULUCF regulation. ○	**TAP:** **Number of comments against: 0** No outright argument against using the definition from the LULUCF regulation. Except that in one occasion the use of a single definition was preferred, but this did not go with an explanation for this preference or an argument against the use of the LULUCF definition. There was one response indicating that no definition is needed. **Reasons con/problems identified:** ○ No arguments provided.
Use one single definition (e.g. FAO, Forest Monitoring Law) applicable to forestry related activities in all MS	**TAP:** **Number of comments in favour: 1** Only 1 respondent preferred the use of one single forest definition. Most responses did not give a clear preference on the use of the forest definition. **Comments/Reasons pro:** ○ this is a necessary for creating a fair framework for all of the MS, instead of having different definitions in different MS.	**TAP:** **Number of comments against: 3** The comments were not so much against the use of one single definition, but rather identified issues related to references to the forest monitoring law and taxonomy **Reasons con/problems identified:** ○ Premature to relate to the FML as this is still in negotiation. Try to be consistent with the definitions in the LULUCF regulation and the GHG inventories of MS ○ Same for using the forest definition and sustainability criteria from the Taxonomy as it is not yet approved for forestry. ○ No need to define forests. Having a clear baseline and approved additional measures fulfils the needs for market actors and the climate impact.

Should also "Other wooded land" (OWL) be considered for certification	**TAP:** **Number of comments in favour: 0** No comments received in favour of using OWL. **Comments/Reasons pro:** ○ None	**TAP:** **Number of comments against: 1** Only one comment was specifically against included OWL, non of the other responses mention OWL **Reasons con/problems identified:** ○ OWL as this is not a LULUCF category
Questions and remarks on forest definition	**One questions posed:** ○ Why different forest definition between MS's in LULUCF would be a problem for transactions under CRCF? Trading will be done in CO2-eq., so the definition of forest is actually irrelevant to the quantities. **General remarks:** -	
2.3 Forestry activities. 17 responses.		
Include reforestation as an activity	From the comments received it is clear that reforestation as an activity can be interpreted in different ways. If it is included as an eligible activity it needs to be defined very clearly. There are basically two different interpretations. 1) Related to its use in the context of the IPCC, UNFCCC and National GHG Inventories (GHGI), which implies a change in land-use. It relates to units of land that in a certain past were forest land and then were in a different land use for a certain amount of time, before converted to forest land again. This explicitly does not include temporary unstocked land after a harvest and the subsequent regeneration of new trees. In terms of National GHGI this would be considered to remain forest land and the activity would be covered under managed forest land. 2) The other interpretation of reforestation is an activity referred to in forestry as the natural or artificial regeneration of a forest after a harvest event. Enabling this regeneration after harvest is mandatory in most, if not all, EU MS. Failure to adhere to this would imply deforestation. The unstocked status may take a couple of years, but usually will and should not be more than 5 years. In national GHGI reports this would be included under forest land remaining forest land, and in the first compliance period (2021-2025) of the EU LULUCF regulation considered under the accounting category managed forest land. In the context of the TAP reforestation was defined as explained under the first point above, but in some of the existing certification systems it is used as explained under 2), which further adds to the confusion. One of the comments suggested to use the term GHGI term reforestation for the first context and forest regeneration for the second.	
Reforestation	**TAP:** **Number of comments in favour: 3** **Comments/Reasons pro:** ○ Crediting should only apply to verified changes in management leading to increased removals ○ Cut-off date necessary to avoid credits on recently deforested land.	**TAP:** **Number of comments against: 1** **Reasons con/problems identified** ○ A concern was raised that carbon credits potentially justify and incentivise the destruction of existing forests. This is a big risk, given the popularity of large-scale tree planting projects in current offset

		○ The Spanish method is going to update its rererence date, since it would be more reasonable to use new national GHG inventory methods thand Kioto protocol requirements. This means we will establish 20 years instead of 31-12-1989 as reference.	projects. Tree plantations are very distinct from healthy, biodiverse forests. ○ Reforestation after deforestation: time should be as long as possible but be at least 7 years to allow for natural regeneration. ○ Natural regeneration should get priority above plantations because naturally regenerated forests are more resilient. The opposite (incentivising conversion from natural forests to plantations should be prevented! ○ Afforestation and reforestation need to be strictly distinguished. Using forest cover in 1989, as is done in the Spanish method, is more reliable to do so than using 20 years (LBC).
	Forest regeneration	**TAP:** **Number of comments in favour: 6** **Comments/Reasons pro:** ○ Incentives should be focused toward activities that are not mandatory. ○ All means of regeneration should be allowed (naturel regeneration and artificial regeneration through several means like planting, sowing and coppicing providing that it delivers site adapted tree species. ○ Reforestation (forest regeneration): under LBC this is eligible on degraded forests after natural disturbances. It is not considered a land-use change, but used similar to the forestry definition of reforestation. It provides an incentive for enhanced recovery after a natural disturbance compared to natural regeneration which often is the BAU in France. ○ Afforestation is the most efficient activity in terms of tCO2/euro in the label Bas Carbone even with slow growth rate species ○ It important to limit the type of previous land to avoid carbon leakage. If is allowed to afforest on agricultural land, the net carbon gain of the project will be obviously reduced because of the displacement of the agricultural activity	**TAP:** **Number of comments against: 1** **Reasons con/problems identified** ○ Obligations to ensure regrowth of new forests after felling is current practice in several member states. Efforts should be made to ensure that the requirements are comparable in different Member States in order to not distort the market and create unfair conditions for competition.
Change in forest management (e.g. climate smart forestry)		**TAP:** **Number of comments in favour: 9** Almost all comments that explicitly reflected on a change in forest management raised some concerns, reflected in the list below, but none had outright arguments against allowing change in forest management. **Comments/Reasons pro:**	**TAP:** **Number of comments against: 1** No outright arguments against including change in forest management as an eligible activity. **Reasons con/problems identified** ○ FM first needs further definition of what is improved forest management and what practices this could cover. This should also

	○ Crediting should only apply to verified changes in management leading to increased removals ○ FM practices that align with close to nature forestry principles; ○ But will require careful consideration of eligible activities qualifying for generating carbon removals. BAU activities should consider harvesting levels to prevent adopting postponed harvest activities in forests that were never harvested nor would be harvested. ○ FM activities implemented within the framework should contribute to long-term climate change mitigation and not inhibit the continued development of a sustainable circular bioeconomy ○ FM in the definition as used in the TAP brings a risk of incentivizing a simplification of forest structures in order to achieve increased carbon removals. The CRCF methodologies should therefore introduce requirements ensuring the use of site-adapted tree species composition and creating more complex forest structures (mixtures of native of other site adapted species and management aiming at improving forest structure and stability in the future. ○ Adaptation practices can also simultaneously been implemented. ○ Active forest management activities must be included as a suitable option depending on the local circumstances. ○ Allow all types of management changes as long as they are legal in the originating MS. The climate impact is what we are after, not the method how it is done.	allow for including forest management activities that increase production or generate better quality wood for long-term storage.
Afforestation	**TAP:** **Number of comments in favour: 6** **Comments/Reasons pro:** ○ Afforestation has great carbon removal potential, but also includes a risk of ILUC which needs to be addressed. Distinciton should be made between commercial plantations for harvesting and natural forests. Therefor only allow afforestation only on degraded or non-productive land. ○ Afforestation: definition shall include, besides planting, natural forest expansion that may occur due to changed management regime on non-forest land. ○ The issue of limiting afforestation options to a certain type of land use: there are other legislative acts aimed at protecting valuable parts of the country, there is no need to complicate the certification methodology.by such limits	**TAP:** **Number of comments against: 0** **Reasons con/problems identified**

Questions and remarks on forestry activities	**Questions / Need for elaboration:** ○ - **General remarks for change in reforestation/forest regeneration:** ○ Cut-off dates for afforestation and reforestation activities are very important questions to answer (and are recognised in the report as open questions) and need careful attention but these dates should be well before the certification scheme is implemented as not to encourage deforestation for reforestation or change in forestry management practices to enable future certification ○ Concerns were raised that an inappropriate inclusion of reforestation (i.e. forest regeneration) into the methodology may provide some inadvertent consequences for future policy development in member states. ○ **General remarks for change in Forest Management:** ○ We received mixed feedback on the question regarding creating lists of eligible and ineligible forest management measures; ○ Several forest management activities are possible, which should be seen as an asset that gives freedom of choice for forest owners and provide a set of possible alternatives for implementation. The creation of positive lists always carry the risk of excluding alternatives whose potential is not sufficiently understood today, but that may prove to have potential in the future. Exclusion from the list may become an administrative barrier for activities, hindering their potential development. ○ A non-exhaustive list of eligible forestry activities has the merit of responding to the specific characteristics of the different forests of Europe. This should, however, also include non-eligible activities ○ The methodology for forest management should take into account the risk of displacement of emissions. When felling is reduced in one forest stand, felling increases in other stands, provided that the demand for forest biomass is the same. ○ Rather than having a comprehensive list of forest management practices that are allowed, robust methodologies for quantification are needed. For some FM practices it is difficult to define a baseline ○ As increment growth in forests is related directly to carbon sequestration and as CRCF acknowledges as well carbon stored in products forest management activities that increase production or generate better quality wood for long-term storage should be as well under improved forest management activities. ○ Activities should include clear changes in forest management and adoption of measured that enhance carbon removals. This should be embedded in a forest management plan that also includes measured to create biodiversity co-benefits. Switching from active to passive forest management (set asides) does not bring additional climate benefit. Closer to nature management practices may reduce biogenic carbon emissions in the short-term, but may entail a risk of decreased carbon removals in the long-run. Active forest management activities must be included as a suitable option depending on the local circumstances **General remarks Afforestation:** ○ The issue of limiting afforestation options to a certain type of land use: there are other legislative acts aimed at protecting valuable parts of the country, there is no need to complicate the certification methodology.by such limits. ○ Changes to albedo should be considered for approving afforestation activities. Afforestation of lands that were not previously forested may not always be appropriate. In particular, there should be consideration of the effect of afforestation on changes to albedo, the reflectivity of the land surface, that could cause biophysical warming impacts by absorbing more heat than an unforested land surface and possibly counteract the climate benefit of the carbon project.

	○ cut-off dates for afforestation and reforestation activities are very important questions to answer (and are recognised in the report as open questions) and need careful attention but these dates should be well before the certification scheme is implemented as not to encourage deforestation for reforestation or change in forestry management practices to enable future certification. ○ Afforestation has great carbon removal potential, but also includes a risk of ILUC which needs to be addressed.	
2.4 Carbon pools. 10 responses.		
Include above- and belowground living biomass	**TAP:** **Number of comments in favour: 9** **Comments/Reasons pro:** ○ Aboveground and belowground biomass will be the primary pools impacted by all types of project activities and should be accounted ○ The carbon pool in living tree biomass is the most dynamic and possible to control by management.	**TAP:** **Number of comments against:** No outright arguments against including above- and belowground living biomass. **Reasons con/problems identified** 1
Include other carbon pools (DOM and soil)	**TAP:** **Number of comments in favour: 6** **Comments/Reasons pro:** ○ A comprehensive quantification that includes all carbon pools (including deadwood and soils) is important precisely due to the interaction between the carbon pools. ○ Soil carbon should also be considered as some FM practices could have major impacts on soil carbon levels. In Finland a lot of forest grows on peatland and forest management practices have a huge impact on degradation of peatlands. From the Finnish Perspective important that the Forestry and Peatland delegated acts are very tight: No loopholes but no overlapping, either. ○ Deadwood and litter should be considered based upon the activity being implemented and always be included when doing so is conservative, meaning that incorporating deadwood and/or litter will reduce the number of credits certified. ○ Even though it is difficult to quantify the dead organic matter and soil carbon, it is important to include all pools for transparency reasons and to be sure that some are not excluded because of their negative impacts whereas the ones with positive impacts are taken into account.	**TAP:** **Number of comments against: 3** **Reasons con/problems identified** ○ Crediting for increased soil carbon storage resulting from forestry activities is too uncertain to be included in quantifying units, but disturbance related soil emissions should be accounted for. ○ Taking into account litter and deadwood means incorporating a big amount of uncertainty and complexity to the methodologies. In most of the cases these pools are going to be neglectable. ○ In the case of soil carbon, may be the agriculture soil module could be used. But in any case, it is important to make things simple. ○ The uncertainties in estimates of carbon pools other than the biomass of living trees are so great that for the time being they should not be included as a basis for issuing carbon credits. Nevertheless the operator will need to (scientifically) prove should that carbon pools in dead wood, litter and soil are not negatively affected by the activity.

Questions and remarks on carbon pools in general	**Questions / Need for elaboration:** ○ None **General remarks:** ○ The DA should define specific rules for inclusion of carbon pools, building on criteria as potential changes in carbon stock (XX% of potential net carbon removal benefit), the proportion of the pool in the land category (no exclusion of major pool), the accuracy of the results (there is no point in including a carbon pool if it increases the uncertainty of the result), the availability of data and the cost / effectiveness of the monitoring. ○ Methodologies should be aligned as much as possible with the most recent IPCC guidelines for national GHG inventories and render mandatory for project to use specific national or regional data when available. ○ HWP is mentioned in the TAP to be outside the scope of the forestry methodology and instead is in the scope of "Carbon storage in products". Yet HWP need to be part of the quantification of the baseline if the project reduces or postpones harvest and generates a decrease of HWP carbon pool such as in "Extension of rotation age" projects (Haya et. al, 2023). In such projects, the HWP pool has to be calculated in the baseline to avoid over crediting and must be considered and quantified as a potential leakage. ○ Consider the use of a "de minimis" rule for some activities/methodologies. For instance, an afforestation project will generate very little deadwood in its first decades so this pool could be neglected in an afforestation methodology but should not be neglected in a FM methodology DOM and soil remarks: ○ In Finland a lot of forest grows on peatland and forest management practices have a huge impact on degradation of peatlands. From the Finnish Perspective important that the Forestry and Peatland delegated acts are very tight: No loopholes but no overlapping, either.

Total contributions on forestry: 25
Contributions on forestry regarding quantification: 21

ADDRESSED QUESTION/TOPIC	PRO ARGUMENTS	ARGUMENTS CON/PROBLEMS IDENTIFIED/ADDITIONS		
3.2 Quantification approaches for forest carbon stock changes	○ **Hybrid approach**: modelling, remote sensing, and in-situ measurements ○ **Biomass Expansion Factors (BEF)** should be country-specific value or based on regional default values provided at the certification scheme level ○ Consider replacing "biomass expansion factors (BEF)" with "basic wood density" ○ Recommendation: more comprehensive **initial sampling** e.g., during baseline determination with resampling and verification at regular intervals ○ CRCF activities should aim for **more accurate data** than GHGIs (higher tiers and spatially explicit approaches)			

	○ Recommend **not to include HWP pool** in carbon farming methodologies – all carbon stock losses due to harvest should be accounted as direct emissions ○ Quantification should be **differentiated per pool** (e.g., NIR values, BCEFs, tier 1 estimates for soil and deadwood) ○ **Cautious about flexibility** when quantifying carbon pools - can lead to systematic over-estimate		
3.4 Rules for baseline	○ Baselines must be defined on a very **detailed/local level** ○ Baselines should be defined **for every carbon pool** by mean values achieved in European regions (i.e., not only in particular member states) under the similar climatic conditions. ○ In favour of using **national, regional validated data**, e.g., NFI or soil database ○ AF/R have **different impacts on the timing of removals** that need to be recognised in the methodology ○ For AF: baseline should consider the **existing carbon stock** in the previous land use ○ For AF/R: should include **growth assumption** for avoiding risk of overestimation ○ Baseline should be determined with a **separate sample/reference** plot outside the project, not a model ○ Setting of a sample/reference plot is risky and should be outside the power of both the operator and the certification scheme ○ Setting baseline at zero problematic and undermines trust		
3.4.2 Standardised baseline	○ ○ Easier to use static baseline	○ ○ Will not work for forestry and should be stated clearly in TAP ○ reasons: Variability in Forest Ecosystems, Site-Specific Factors, Human Intervention,	

	○ Interesting to have standardized baselines at the level of volumes and applied same (national, specific) BCEF's for the baseline and carbon removals activity ○ For FM change project, it would be better to have standardised baselines at the level of carbon stocks ○ Reference period should be different depending on the sectors or even inside a sector, e.g. standardised baseline for AF 2 years enough, but for FM change 5-10 years more appropriate	Natural Disturbances, Temporal Dynamics ○ Standardized baseline entails risk of creating units without any additionality ○ Standardised baselines don't consider what a forest ecosystem is capable of: *is there a way to assess where forests are in relation to carbon potential across all pools of their forest type?* ○ If standardized data is used, it should consider regional and country-specific data, like forest types, rotation lengths ○ Default standardised baseline should be given a higher discount compared to activity-specific baseline ○ Standardised baseline can lead to windfall effect - use tools like a discount to account for windfall effect	
3.4.3 Activity-specific baseline	○ Should be **standard practice** ○ DA must require baseline that are **dynamic, updated regularly** ○ Incorporation of **dynamism** through two ways: Using **empirical observations** during the crediting activity period of well-matched reference areas or **regular reassessment** of the baseline scenario assumptions ○ Use **independent datasets** for spatial information on land use conversion for baseline assessment over time ○ **Option B "use model/yield data to predict baseline**" easiest to implement ○ Should always be allowed on the condition they generate and use better or same data for accounted pools ○ Incentivise investments in MRV and data products		

	○ For reforestation: dynamic baselines based on regional averages could help account for natural regeneration		
Indirect emissions/leakage/ILUC	○ Exclude carbon removal activities with high risk of ILUC ○ In favour of a new incentive program on activities with lower risk of causing leakage ○ Quantifying small amount of leakage ○ How will geographic boundaries for the system be defined to determine the impact the project has on ILUC? (regional, national, EU, global) ○ Ensemble approach should be considered ○ DA should identify emission sources to be quantified by the operator for each type of forest activity (e.g., fertilizers, road building and transportation emissions) ○ DA should at least identify most problematic activities (for leakages) and propose a method to take ILUC into account (e.g., discounting factor)	○ Unnecessary since all emissions are accounted at any moment in the supply chain ○ Monitoring or influencing the carbon leakage or indirect emissions is impossible at the project level ○ Impossible for landowner to know whether carbon sequestration operation will cause additional felling in another area or leakage/land use change ○ Concept of leakage/ILUC is against polluter pays principle	
3.5 Quantification of uncertainty	○ DA should provide rules for discounting depending on level of uncertainty in the quantification (very likely, likely, non-likely, etc.)		

	○ Should be quantified (in accordance with IPCC guidelines)	
"Early movers"	Rewarding early movers ○ Additional use cases beyond unit generation should be considered ○ Example: activity-based finance and contribution claims Not recommendable to reward early movers ○ These credits would not be additional if they are used to offset emissions	

Summary TAP feedback – Forestry – Additionality		
Total contributions: 18		
Options/topic	PRO ARGUMENTS	ARGUMENTS CON/PROBLEMS IDENTIFIED
4.2 Additionality rules		
Financial additionality (test)	**TAP:** **Number of comments in favour: 0** There is no outright agreement in favour of financial additionality or it was not addressed **Comments/Reasons pro:**	**TAP:** **Number of comments against: 1** Only 1 response mentioned that multiple financial additionality tests are appropriate, but without further explanation on this **Reasons con/problems identified:**
Financial additionality (fund)	**TAP:** **Number of comments in favour: 4** Four respondents explicitly mentioned co-funding or a combination of sources of funding would be favourable. **Comments/Reasons pro:** • When assessing co-funding with public support, it should be justified that the funding from carbon finance is	**TAP:** **Number of comments against: 0** There were no comments explicitly against, but there was one concern that a financial attractiveness test is rigorous. **Reasons con/problems identified:** • Rigorous financial attractiveness tests and rigorous legal tests are both needed to assess additionality. "Promoting early movers" is not a strong

	necessary to implement the project because the public support in insufficient. Avoid creating of greenwashing. • Avoid double funding, which is currently not explained well in the TAP and needs further elaboration. • The LBC approach setting a limit of 50% of public funding was considered as an interesting approach by some. Another respondent considered a lower limit of 30% more appropriate	enough reason to undermine the credibility of certified carbon credits by jeopardizing additionality.
Additionality criteria based on baselines	**TAP:** **Number of comments in favour:** The comments that address additionality in relation to the standardised baseline all ask either for clarification or are against the rule that the use of the standardised baseline would imply that the resulting carbon removals are additional **Comments/Reasons pro:**	**TAP:** **Number of comments against: Some** Standardised baseline does not make sense. **Reasons con/problems identified:** • The argument that "In case of an activity that performs better than the standardised baseline, the additionality criteria are considered to be complied with" is not clear and needs to be proved.
Regulatory additionality	**TAP:** **Number of comments in favour: 5** There is mixed responses to the possibilities of regulatory additionality, Regarding the specific case and question for a common practice test and the threshold that should be used there were 4 responses of which 3 in favour and 1 against. **Comments/Reasons pro:** • Only relevant for forest management, not for afforestation/reforestation. • Common practice test was considered appropriate by 3 respondents with thresholds between 20 to 30% • No activity should be eligible when mandatory because of national, regional or local policies	**TAP:** **Number of comments against: 1 and some raising concerns** There was only 1 response explicitly against the use of common practice test for determining regulatory additionality. Additionally also concerns for using regulatory additionality more in general were shared. **Reasons con/problems identified:** • Common practice test was considered problematic by one responder. Many actors are implementing more sustainable and close-to-nature forest management practices without the CRCF. This means that none of those practices should be considered additional • There is some concern around fairness for operators with differences in country specific forest related legislation. In some countries there are more strict requirements for forest management than in others, which would make

		specific management practices common in some countries and not common in others. • There are also some more mixed messages in the problems identified. For some it is important that national targets for e.g. forest measures and LULUCF do not affect the additionality for an individual operator if the activity contributes to meeting those targets, while another response
Questions and remarks	**Questions:** **General remarks:** • Existing carbon stocks should not be rewarded. All activities must be shown to be additional. • Baseline should take into account the property's existing timber stock, including age class distribution and future natural development • The Taxonomy Regulation's delegated act to limit climate change can be taken into account regarding how Business-as-usual (BAU) can be established, for example through the latest forest management plan or equivalent instrument before operations • The UNFCCC Article 6.4. Supervisory Body is developing an additionality assessment that can also be taken as an example. • It should be considered to have different additionality rules for state-owned forest and management, to prevent these state-owned lands to be excluded from future markets.	

Total contributions on forestry: 25 **Contributions on forestry regarding liability: 14**		
ADDRESSED QUESTION/TOPIC	PRO ARGUMENTS	ARGUMENTS CON/PROBLEMS IDENTIFIED/ADDITIONS
5.2. Minimum duration of the activity period	○ COMM should propose **a minimum and maximum duration** for the activity period, as well as a **maximum duration** for which an activity can generate credits	

	○ COMM should **align its rules** with guidelines already in place under **Article 6** ○ **Activities that enhance biogenic carbon pools** should be maintained for long periods of time, well beyond the 5-year certification period ○ Difficult for public landowners to commit to periods of **30 years** or longer (administrative legislation) – **barrier** for participating **Definition for different periods - suggestions:** *"We suggest that **activity period** is defined as the period during which the carbon dioxide is captured, **commitment period** is the period that the landowner guarantee to store the carbon dioxide that is captured in living tree biomass (same as permanence), monitoring period is the period during which regular checks of the carbon stock in living tree biomass take place (same as the commitment period). The **crediting period** is something between the issuer of the credits and the operator and falls outside the scope of the EU framework."*	
Monitoring	○ Monitoring time periods should be **activity-specific**	○ **Monitoring should be based on the intended use of the unit** (and not specific forestry activity) ➔ **short monitoring periods:** for non-offsetting contexts or for offset of biogenic emissions ➔ **longer monitoring periods:** for offsetting-purposes
5.3 Minimum duration of the monitoring period	○ Define a **minimum and maximum length of the monitoring period**, considering risk of reversal of the activity ○ Monitoring period should be longer than activity period, given risks of reversal ○ Activity and monitoring should have same length or else there is no incentive anymore ○ **Certification methodologies** should **incentivize** operators to prolong the monitoring period several times, with the aim of storing captured carbon for at least several decades. ○ Monitoring could be aligned with updates of forest management plans of MS	

	○ Undertake a cost-benefit assessment for monitoring period ○ For forest activities a short frequency of monitoring not necessary	
Liability mechanisms **Buffer pool**	○ Most incentive option ○ A common and widely used mechanism	○ Often subject to total failure well before expected duration (see ex. California) ○ Absence of longer-term liability ○ Difficulty of estimating risk of reversal **When opting for buffer pool mechanism, then following points should be considered:** ○ Needs to be well-supervised in terms of stress tests, its composition and the rules governing its supply ○ Buffer pool should represent an important part of the credit, in order to be incentive ○ Define a backstop mechanism
Discounting	○ Easiest mechanism ○ Discounting necessary in order to accommodate the large uncertainties associated with quantification of carbon flows	○ No incentive for foresters to maintain their practices **When opting for discounting mechanism, then following points should be considered:** ○ Liability mechanism needs to be extremely strict if the units are to be used to compensate for emissions
Insurance	/	○ Underdeveloped mechanism and should not be used alone

Total contributions on forestry: 25
Contributions on forestry regarding sustainability: 17

ADDRESSED QUESTION/TOPIC	PRO ARGUMENTS	ARGUMENTS CON/PROBLEMS IDENTIFIED/ADDITIONS
Existing methodologies (FSC/PEFC) for minimum sustainability criteria	○ Cost-efficient and less administrative burden ○ Fulfil DNSH principle ○ Take all main sustainability aspects into account ○ Locally adjusted ○ Existing methodologies already accepted; adoption rates of CRCF should be higher ○ Encourages owners to certify their forests ○ Regularly reviewed in an open process/3rd party verified	○ Do not include co-benefits
Positive practice list / negative practice list	○ Positive list would decrease the amount of reporting burden and costs ○ Negative list needed - systematic interdictions of certain practices: clearcuts, replacement of existing forests with plantations, afforestation on peatlands	○ Best/bad practices depend on local conditions ○ Positive list alone does not suffice – quantification needed as well ○ Might end up being political
Co-benefits	○ **Quantitative assessment based on set of criteria and indicators** → On site audit + comparison of photographs	○ Value of carbon credits and biodiversity co-benefits must be managed separately

	→ Possible to separate the methodologies between mandatory co-benefits and non-mandatory ○ Guidance on maximum/ minimum application or implementation thresholds to reduce the risk of unsustainable practices ○ Severe penalties if rules not followed ○ Social co-benefits should be acknowledged in the methodologies ○ For co-benefits an extended geographical area e.g. the property or management unit, should be considered to allow for more local adaptation of measures/flexibility	
Indicators for co-benefits	○ CBD indicators ○ Indicators undertaking by IPCC (to be published around 2026) ○ EU Taxonomy Regulation ○ Forest Europe's criteria and indicators for Sustainable Forest Management ○ Propositions of indicators: species diversity (number of species that are in project), the quality of the diversification (intraparcel mixing in tree strips, intraparcel mixing by tree bouquet, intraparcel mixing tree foot by tree foot), soil preparation (no soil preparation, soft preparation)	
Taxonomy (substantial contribution) criteria	○ Carbon removal activity must at the bare minimum comply with the Taxonomy Substantial Contribution Criteria for the climate mitigation objective. In many cases, these criteria are seriously flawed (e.g., on	○ Should not be part of it as it is not yet approved

	bioenergy) and will not be sufficient by themselves	
Others	○ Consider albedo effect of forests ○ Nature regeneration should be more strongly encouraged	