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Netherlands Technical Agreement

NTA 8080-2

Duurzaamheidskader voor biomassa — Deel 2: Duurzaamheidseisen

Sustainability framework for biomass — Part 2: Sustainability requirements

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Contents

Foreword

Please Note: This is a draft version, for information purposes only!

Sustainability framework for biomass — Part 2: Sustainability requirements

1 Scope

This document describes the sustainability requirements for bio-based raw materials intended to be used for energy or in products..

NOTE 1 The sustainability requirements are described in NTA 8080-2:2024, the requirements and guidance for calculating greenhouse gas emission savings are described in NTA 8080-3:2024, and the chain-of-custody requirements are described in NTA 8080-4:2024.

This document is applicable to following types of organizations:

— 'producer': organization that produces agricultural biomass or collects biobased residues and waste to be used for energy or in products, for which four sub-types are distinguished:

1) 'primary producer';

2) 'smallholder';

3) 'collector of primary residues and waste';

4) 'collector of non-primary residues and waste';

— 'processor': organization that processes biomass and or intermediates / semi-finished products for further use in the supply chain;

— 'trader': organization that buys and sells (processed) biomass without modifying the materials;

— 'end user': organization that valorises (processed) biomass for application in energy or finished products.

The operations of an organization can include more than one type.

NOTE 2 An organization that only transports produced and or processed biomass, but does not own this material, is not included in the scope of this document.

NOTE 3 The processes to produce the materials and or products are assessed, because it is not possible to assess the physical material or product itself on sustainability aspects.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NTA 8080-1:2024, *Sustainability framework for biomass — Part 1: Terminology, overview and general requirements*

NTA 8080-3:2024, *Sustainability framework for biomass — Part 3: Requirements and guidance for greenhouse gas calculations*

NTA 8080-4:2024, *Sustainability framework for biomass — Part 4: Chain-of-custody requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions in NTA 8080-1:2024 apply.

4 General

4.1 The organization shall conform to the requirements of NTA 8080-1:2024 with respect to its activities and NTA 8080-4:2024 with respect to its chain of custody.

4.2 The organization shall consult the stakeholders who are or can be effected by its activities in the area where the production location is or will be established. Annex A describes the requirements for this stakeholders consultation, including the organization of the consultation, the sustainability aspects to be addressed, and the exemptions to execute a stakeholders consultation.

5 Greenhouse gas emissions saving

5.1 Greenhouse gas emissions saving in the case of bioenergy

5.1.1 If biomass are used for energy, the minimum net greenhouse gas emissions saving relative to the fossil reference system shall meet the following values. The values stated relate to the overall performance to be achieved in the entire supply chain.

The minimum net greenhouse gas emissions saving relative to fossil reference system for application in transport, electricity, heating or cooling are:

— at least 50% for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations in operation on or before 5 October 2015

— at least 60% for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations starting operation from 6 October 2015 until 31 December 2020

— at least 65% for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations starting operation from 1 January 2021

— at least 70% for electricity, heating and cooling production from biomass fuels used in installations starting operation from 1 January 2021 until 31 December 2025, and 80% for installations starting operation from 1 January 2026

— An installation is considered to be in operation once the physical production of fuel, heat or cooling, or electricity has started (i.e. once the production of fuels including biofuels, biogas or bioliquids, or production of heat, cooling or electricity from biomass fuels has started).

5.1.2 The greenhouse gas emissions from the production and use of transport fuels, biofuels, bioliquids and biomass fuels shall be calculated in accordance with NTA 8080-3:2024.

5.1.3 The organization shall made available the necessary data and information related to the greenhouse gas emission performance, including information about the date when the installation in the supply chain has started the production, so that the 'end user' can make the greenhouse gas calculation in accordance with NTA 8080-3:2024 to verify whether the values stated in paragraph

5.1.1 are met. This data and information shall be included in the transaction document in accordance with NTA 8080-4:2023, Clause 6.

5.1.4 The values stated in paragraph 5.1.1 relate to normal operations, recognizing that the production efficiency can be lower in case of technical failure, planned or unplanned maintenance or other events. The actual efficiency of the production installation during normal operations shall conform to the minimum net greenhouse gas emission savings in paragraph 5.1.1, supported by the technical specification of the production installation that this production efficiency can be achieved. The organization shall demonstrate that the performance of the production installation is part of continual improvement as described in NTA 8080-1:2023, 5.7.

5.2 Greenhouse gas emissions saving in the case of biobased products

5.2.1 If biomass are used in products for other applications than energy, the organization shall have access to the data on its own greenhouse gas emission performance and the greenhouse gas emission performance in the preceding supply chain.

NOTE 1 Access to the data on the greenhouse gas emission performance enables the supply chain performance to be established and the biomass to be kept exchangeable with bioenergy supply chains.

NOTE 2 No requirements are set on the net minimum greenhouse gas emissions saving, since no (unambiguous) fossil reference systems are available. Validated fossil reference values are often not available and in many situations the fossil reference cannot be determined unambiguously.

5.2.2 When calculating the greenhouse gas emissions from the production of biobased products, the organization can use the calculation methodology in NTA 8080-3:2024, taking into account the difference between biofuels, bioliquids and biomass fuels. In the event of biobased products, emissions from the fuel used do not apply.

6 High-carbon stock

6.1 The organization shall not produce or use agricultural biomass from land with high-carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status:

a) wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year;

   NOTE 1 To demonstrate whether the land meets this definition of wetlands, evidence that reflects the seasonal changes during a year is to be provided as part of the conformity assessment activities.

b) 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*;

   NOTE 2 It does not include land that is predominantly under agricultural or urban land use, in which land under agricultural use in this context refers to tree stands in agricultural production systems, such as fruit tree plantations, oil palm plantations and agroforestry systems when crops are grown under tree cover.

c) land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds in situ, unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology in accordance with NTA 8080-3:2024 is applied, the greenhouse gas emissions saving requirement in paragraph 5.1.1 would be fulfilled;

d) peatland, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.

NOTE 3 In this context, production from peatland that was partially drained in January 2008 and where subsequent deeper drainage affects soil that was not fully drained is not allowed.

NOTE 4 EN 16214-3 can be used to determine whether a peatland area is excluded from agricultural biomass production.

6.2 Within the framework of Directive (EU) 2018/2001, the country in which forest biomass for biofuels, bioliquids and biomass fuels production was harvested shall have national or sub-national laws applicable in the area of harvest as well as monitoring and enforcement systems in place ensuring:

— the legality of harvesting operations;

— forest regeneration of harvested areas;

— that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including in wetlands and peatlands, are protected;

— that harvesting is carried out considering maintenance of soil quality and biodiversity with the aim of minimizing negative impacts;

— that harvesting maintains or improves the long-term production capacity of the forest.

When the evidence as required in aforementioned list is not available, the organization operating at forest sourcing area level shall have a management system in place that ensures:

a) the legality of harvesting operations;

b) forest regeneration of harvested areas;

c) that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including in wetlands and peatlands, are protected unless evidence is provided that the harvesting of that raw material does not interfere with those nature protection purposes;

d) that harvesting is carried out considering the maintenance of soil quality and biodiversity with the aim of minimizing negative impacts;

e) that harvesting maintains or improves the long-term production capacity of the forest.

NOTE 1 The purpose of this requirement is to minimize the risk of using forest biomass derived from unsustainable production.

NOTE 2 Biodiversity aspects are addressed in Clause 7.

6.3 Within the framework of Directive (EU) 2018/2001, the country or regional economic integration organization of origin of the forest biomass for biofuels, bioliquids and biomass fuels production shall be a party to the Paris Agreement and shall either

— have submitted a nationally determined contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC), covering emissions and removals from agriculture, forestry and land use which ensures that changes in carbon stock associated with biomass harvest

are accounted towards the country's commitment to reduce or limit greenhouse gas emissions as specified in the NDC; or

— have national or sub-national laws in place, in accordance with Article 5 of the Paris Agreement, applicable in the area of harvest, to conserve and enhance carbon stocks and sinks, and providing evidence that reported land-use, land-use change and forestry (LULUCF)-sector emissions do not exceed removals.

When conformance to aforementioned requirements cannot be demonstrated, the organization operating at forest sourcing area level shall have a management system in place that ensures that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term.

6.4 Within the framework of Directive (EU) 2018/2001, the organization can be required by a European Member State to provide information to demonstrate conformance with the relevant harvesting and LULUCF criteria addressing carbon stocks and sinks when using forest biomass. If required, the organization shall apply the specific requirements in Annex B.

6.5 Prior to installing a new production location, the organization shall establish which carbon stocks in the vegetation and in the soil are lost due to the production location being installed. If the organization has to use a for this purpose established and recognized procedure in order to establish the carbon stocks, such procedure shall comply with Commission Decision 2010/335/EU.

6.6 With respect to forest biomass, the following types of biomass shall not be used, as far as not already excluded by other provisions:

a) stumps from sustainably managed forests, unless these should be removed for other reasons (e.g. road construction);

b) unprocessed wood from the trunk of a tree (round timber) from sustainably managed forests with a rotation period of more than 40 years, if on average more than 50 % of the timber harvest (excluding thinnings) is processed into biomass fuels.

6.7 In the case of forestry, the organization shall maintain the production capacity of all forest types represented in the production location. The organization shall have written proof for all forest biomass that the production location from which the timber originates, is managed in order to maintain in the long-term or to increase carbon stocks by demonstrating that the carbon cycle remains at least maintained.

NOTE This proof can be provided in the form of a (sustainable) forest management plan or similar evidence.

7 Biodiversity

7.1 The organization shall not produce or use agricultural biomass from land with high biodiversity value, namely land with a high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have that status:

a) primary forest and other wooded land, namely forest and other wooded land of native species, where there is no clearly visible indication of human activity and the ecological processes are not significantly disturbed;

b) areas designated:

   i) by law or by the relevant competent authority for nature protection purposes;

ii) for the protection of rare, threatened or endangered ecosystems or species recognized by international agreements or included in lists drawn up by intergovernmental organizations or the International Union for the Conservation of Nature, subject to their recognition in accordance with the procedure laid down in article 30(4) of Directive (EU) 2018/2001;

iii) as areas with high conservation value;

NOTE 1 High conservation value area is defined in NTA 8080-1:2024, 3.35.

unless evidence is provided that the production of that raw material did not interfere with those nature protection purposes;

c) highly biodiverse grassland that is either natural or non-natural (see NTA8080-1 3.46 and 3.48), in which the following geographic ranges of the European Union are always regarded as highly biodiverse grassland:

— habitats as listed in Annex I to Directive 92/43/EEC;

— habitats of significant importance for animal and plant species of Union interest listed in Annexes II and IV to Directive 92/43/EEC;

— habitats of significant importance for wild bird species listed in Annex I to Directive 2009/147/EC.

Other grassland can fulfil the criteria for highly biodiverse grassland set out in c).

NOTE 1 Natural and non-natural highly biodiverse grasslands are further defined in NTA 8080-1:2023, 3.46 and 3.48, respectively.

Any land that is, or was, non-natural, highly biodiverse grassland in or after January 2008 may be used for fuels production on condition that harvesting of the raw material is necessary to preserve the status of the grassland as highly biodiverse grassland and that current management practices do not present a risk of causing biodiversity decline of the grassland. The organization shall provide evidence that the harvesting of the raw material is necessary to preserve the highly biodiverse grassland status and that management practices do not present a risk of causing biodiversity decline of the grassland. If the organization is unable to provide this evidence, the organization shall provide evidence that it has been granted permission by the relevant competent authority, or designated agency, to harvest the raw material in order to preserve the highly biodiverse grassland status.

NOTE 2 A.2.4 and E.3.2.1.2 of NCS 8080-1 specify requirements in relation to verification of conformity to the requirements related to highly biodiverse grasslands as specified in this section.

d) highly biodiverse forest and other wooded land, which is species-rich and not degraded, or has been identified as being highly biodiverse by the relevant competent authority, unless evidence is provided that the production of that raw material did not interfere with those nature protection purposes.

NOTE 3 Highly biodiverse forest and other wooded land is further defined in NTA 8080-1:2023, 3.36.

NOTE 4 EN 16214-3 can be used to determine whether certain categories of land with high biodiversity value are excluded from agricultural biomass production.

7.2 The geographic positions of protected areas designated by the relevant competent authorities shall be verified.

NOTE The following sources can be consulted to verify whether land has status of protected area:

— UNESCO World heritage sites (see: http://whc.unesco.org/en/list);

— categories I, II, III and IV from the List of protected areas of IUCN, according to the list available in the world database on protected areas (see: https://www.protectedplanet.net);

— Ramsar areas, i.e. 'wetlands' covered by the Convention on wetlands (see: http://www.ramsar.org), according to the available list or more up-to-date summaries or national data;

— European nature information system (EUNIS) (see: https://eunis.eea.europa.eu/);

— integrated biodiversity assessment tool (IBAT) (see: https://www.ibat-alliance.org);

— important bird & biodiversity areas (see: https://www.birdlife.org/focus-areas/sites/);

— biodiversity hotspots (see: https://www.conservation.org/priorities/biodiversity-hotspots);

— high conservation value (HCV) approach (see: https://hcvnetwork.org/);

— WWF list of ecoregions (see: https://www.worldwildlife.org/biomes).

7.3 The organization shall set aside at least 10 % of the area of the production location, which has the highest conservation value to the landscape concerned, covered in the native vegetation, when installing a new production location that was or is converted from its natural state to land for agricultural biomass production on or after 1 January 2008.

NOTE Areas with native vegetation include representative areas within the production location whether classified as high conservation value area or not. Areas with a high conservation and representative areas within the production location can include one or more of the following values: diversity of species, ecosystems and habitats, ecosystem services, ecosystems at landscape level and cultural values.

EXAMPLE Creating an ecological corridor or a buffer zone around a freshwater hole.

7.4 Production forests including forest plantations shall not have been installed through conversion of natural forests or semi-natural forests as from 1 January 1997. The organization should give preference to native species in the case of forest plantation. At least 5 % of the area of the production location shall be able to regenerate to natural forest or semi-natural forest.

NOTE Areas with native species include representative areas within the production location whether classified as high conservation value area or not. Areas with a high conservation and representative areas within the production location can include one or more of the following values: diversity of species, ecosystems and habitats, ecosystem services, ecosystems at landscape level and cultural values.

7.5 The organization shall document:

a) the type of land-use zone in which the production location is established;

b) a map that clearly indicates the areas with high conservation value, if present;

a) the degree to which the agricultural biomass production contributes to the restoration of degraded areas within the production location.

7.6 The organization shall in accordance with NTA 8080-1:2024, 5.7 take measures to:

a) preserve, and where possible improve, biodiversity within the production location;

b) prevent natural grounds becoming fragmented and scattered by the production location;

c) ensure that it is prevented that the environment is disturbed by people accessing it, by the use of chemicals, and by noise from the production location;

d) ensure that it is prevented that the environment is disturbed by invading alien species (including genetically modified crops) by:

   i) obtaining adequate information on the invasiveness of alien species before using them. If an alien species is classified as highly invasive under equal conditions (climate, ecosystem), its use is not allowed. In order to determine the possible risks of invasiveness under specific conditions in the other situations, a risk analysis shall then have to be carried out. If the risk analysis demonstrates that, under the specific field conditions, the alien species is still highly invasive, it shall not be used either.

      NOTE 1 Adequate information on the invasiveness of alien species can be obtained by using the global invasive species database (GISD) (see: http://www.iucngisd.org/gisd).

   ii) laying down production methods in a management plan that minimize the risk of invasiveness, including mitigating measures in the event that a plant species spreads outside the production location.

      NOTE 2 The precaution principle applies to 'high conservation values' within the production location. In accordance with the scale of the production location, parts of the production location will be designated where no operation takes place and where disturbance due to other activities is minimized, for the purpose of those 'high conservation values'. The 'high conservation values' that occur in the production location need to be described and, if possible, identified on a map.

In the case of forestry, the organization shall take into account that the exploitation of non-timber forest products, including products from hunting and fishing, is part of the monitoring, measurement, analysis and evaluation process to safeguard the preservation and strengthening of biodiversity (see also 7.8). In addition, the organization shall prevent unnecessary damage to ecosystems by applying reduced impact logging and the most suitable road construction methods and techniques for local conditions as part of best available and good practices for forestry.

NOTE 3 Reduced impact logging involves harvesting techniques and methods that have been developed to prevent unnecessary damage to the forest, environment and harvested wood while promoting safe working conditions at the same time.

If the organization cannot take any measures that specifically lead to an improvement of biodiversity, the organization shall indicate the grounds on which it came to this conclusion.

NOTE 4 External factors can also influence the biodiversity within the production location of the organization.

7.7 Where riparian vegetation zones are concerned, the organization shall determine whether a functional buffer of riparian vegetation is present. If this is the case, the functional buffer shall be maintained. If this is not the case, a restoration plan in order to create a functional buffer shall be drawn up. Restoration of a functional buffer shall begin within one year of the start of production and shall be completed within five years.

NOTE In this context, a functional buffer is an area covered with vegetation near water (a 'riparian buffer'), usually afforested, that provides shade that partially protects the water from the influence of adjacent land use. The riparian buffer plays an important role in improving the water quality of brooks, streams, rivers

and lakes, thus causing environmental benefits to be achieved. As the quality of many aquatic ecosystems has decreased due to agriculture, riparian buffers have become a common conservation practice aimed at improving the water quality and decreasing pollution.

7.8 Within its own span of control, the organization shall take measures to prevent its employees and others from killing or catching animals and/or collecting protected plant species at its production location, where this is not part of the management.

7.9 The organization shall indicate any use of genetically modified crops.

8 The environment

8.1 Soil

8.1.1 The organization shall in accordance with NTA 8080-1:2024, 5.7 take measures to ensure that:

a) erosion is prevented and controlled, in which topographic risks are taken into account;

b) the nutrient balance is maintained, at least with respect to nitrogen (N), phosphorus (P) and potassium (K);

c) the soil organic matter (SOM) is preserved and improved over time;

d) the soil fertility and soil structure are maintained and improved over time;

NOTE 1 An organization can apply crop rotation or intercropping to maintain and improve soil fertility and soil structure.

e) soil salination is prevented;

f) emission of greenhouse gases from the soil during the production is reduced;

g) risks for the soil as a consequence of the storage and the use of chemicals and other business processes are prevented and controlled, where:

— the use of pesticides that are classified as type 1A or type 1B by the World Health Organization, and the use of chlorified hydrocarbons are excluded;

— in the case of forestry, chemicals are used only if the maximum use of ecological processes and sustainable alternatives proves to be insufficient.

NOTE 2 BioESoil (see: http://www.wageningenur.nl/en/expertise-services/research-institutes/alterra/facilities-products/software-and-models/bioesoil.htm) can be used in order to provide an understanding of the impacts of the production of bioenergy on soil quality. BioESoil provides an understanding of: nutrient losses during the production of bioenergy, the potential of nutrients being returned by means of residual flows and the effect on the soil organic matter.

NOTE 3 Directive (EU) 2018/2001 also refers to national authorities that have monitoring or management plans in place to address the impacts on soil quality and soil carbon. For the purposes of this document, the organization can make use of monitoring or management plans of national authorities where appropriate to demonstrate conformance to this requirement.

8.1.2 The organization shall in accordance with NTA 8080-1:2024, 5.7 ensure that the use of residues and waste that are released when producing and processing biomass from agriculture, aquaculture,

fishery or forestry does not conflict with other established, local essential functions for preserving the soil and the soil quality.

NOTE 1 This concerns both residues and waste being used by the organization itself and residues and waste being supplied to an organization that collects them for application in bioenergy and biobased products.

NOTE 2 Establishing the other local essential functions can be part of a stakeholder consultation.

NOTE 4 See also 8.1.3 for more detailed requirements related to use of agricultural residues and waste.

8.1.3 If the organization uses primary residual flows from agriculture, the organization shall develop management plans to ensure that the harvesting of agricultural waste and residues [for biofuels, bioliquids or biomass fuels production] does not have a negative impact on soil quality and soil carbon stock. The management plans shall include a consistent set of essential soil management and monitoring practices on the land to promote soil carbon sequestration and soil quality as provided in Tables 2 and 3. The practices listed in Tables 2 and 3 are non-exhaustive and other practices may be applied.

NOTE 1 Directive (EU) 2018/2001 also refers to national authorities that have monitoring or management plans in place to address the impacts on soil quality and soil carbon. For the purposes of this document, the organization can make use of monitoring or management plans of national authorities where appropriate to demonstrate conformance to this requirement.

NOTE 2 Management plans are required at both the national and economic operator level, and reliance on the CAP/GAEC is not sufficient for demonstrating compliance with Article 29(2) of the REDII.

Table 2 — Examples of essential soil management practices to promote soil carbon sequestration and promote soil quality

Practice	Soil quality parameter
At least a 3-crop rotation, including legumes or green manure in the cropping system, taking into account the agronomic crop succession requirements specific to each crops grown and climatic conditions. A multi-species cover crop between cash crops counts as one.	Promoting soil fertility, soil carbon, limiting soil erosion, soil biodiversity and promoting pathogen control
Sowing of cover/catch/intermediary crops using a locally appropriate species mixture with at least one legume. Crop management practices should ensure minimum soil cover to avoid bare soil in periods that are most sensitive.	Promoting soil fertility, soil carbon retention, avoiding soil erosion, soil biodiversity
Prevent soil compaction: i) frequency and timing of field operations should be planned to avoid traffic on wet soil; ii) tillage operation should be avoided or greatly reduced on wet soils; iii) controlled traffic planning can be used.	Retention of soil structure, avoiding soil erosion, retaining soil biodiversity
No burning of arable stubble except where the authority has granted an exemption for plant health reasons.	Soil carbon retention, resource efficiency
On acidic soils where liming is applied, where soils are degraded and where acidification impacts crop productivity.	Improved soil structure, soil biodiversity, soil carbon
Reduce tillage/no tillage: i) erosion control; ii) addition of organic amendments (e.g. compost, manure, crop residues); iii) use of cover crops; iv) rewetting. Revegetation: i) planting (e.g. species change, protection with straw mulch, phosphate fertilization); ii) landscape features; iii) agroforestry.	Increase soil organic carbon

Table 3 — Examples of monitoring practices for soil quality and carbon mitigation impacts

Monitoring approach	Method of verification/demonstration
Risk assessment	Identifying areas with high risk of soil quality decline helps prevent these risks and focus on areas with the greatest impact.
Soil organic matter analysis	Consistent sampling of soil organic matter improves monitoring so that this matter can be maintained or improved.
Soil organic carbon analysis	Soil organic carbon is seen as a good marker for wider soil quality.
Soil conditioning index sampling	A positive value indicates the system is expected to have increasing soil organic matter
Soil erosion assessment	Ensures that erosion is below a tolerable level, e.g. USDA Agricultural Research Service 't' levels.
Nutrient management plan	A plan outlining nutrient strategy (focusing mostly on N, P, K) and fertilizer regimes can prevent nutrient imbalances.
Regular soil pH analysis	Monitoring pH helps identify imbalances in pH.

8.1.4 Within the framework of Directive (EU) 2018/2001, the organization can be required by a European Member States to provide information to demonstrate conformance with the relevant harvesting and LULUCF criteria addressing soil quality when using forest biomass. If required, the organization shall apply the specific requirements in Annex B.

8.2 Groundwater and surface water

8.2.1 The organization shall in accordance with NTA 8080-1:2024, 5.7 take measures to ensure that:

a) water, including irrigation water, is used efficiently;

b) the quality of the surface water due to run-off from, and leaching out of, the production location does not show an increased organic burden of that water, also downstream, as demonstrated by the fact that the biological oxygen demand (BOD) at least stays at the same level or has dropped;

c) risks for the groundwater and surface water as a consequence of the storage and use of chemicals and other business processes are assessed, prevented and controlled;

d) the use of pesticides that are classified as type 1A or type 1B by the World Health Organization, and the use of chlorified hydrocarbons are excluded;

e) in the case of forestry, chemicals are used only if the maximum use of ecological processes and sustainable alternatives proves to be insufficient.

8.2.2 The organization shall in accordance with NTA 8080-1:2024, 5.7 take measures to ensure that no water from non-renewable sources is used when producing and processing agricultural biomass at the production location.

8.2.3 The organization shall ensure that the consumption of groundwater and surface water does not exceed the natural replenishment of the groundwater and surface water system during a five-year average.

8.2.4 When extracting water, the organization shall:

a) take into account:

   i) the level of pressure on the catchment area in which the organization operates;

      NOTE This can be established by using data from the Water Footprint Network (see: http://waterfootprint.org/en/).

   ii) the needs of the aquatic ecosystems present;

   iii) the needs of other users, including downstream users of the same water system;

b) take measures, to the extent that this is possible within its span of control, to prevent or undo any adverse impacts elsewhere or later.

8.2.5 The organization shall implement good water management measures, specifically for rain-fed farming systems and irrigated farming systems.

8.3 Air

8.3.1 The organization shall in accordance with NTA 8080-1:2024, 5.7 take measures to ensure that the emission of harmful substances into the air as a result of the production, processing and transport of agricultural biomass at the production location is limited.

8.3.2 The organization shall not carry out any burning of the stubble or standing crops when installing or managing the production location, unless:

— it is demonstrated that this is the most effective and least harmful method in order to minimize the risk of damage or loss due to diseases and pests or to promote regeneration; or

— this is otherwise good practice in the framework of sustainable management.

NOTE 1 Further information on the most effective and least harmful methods can be found in the guidelines of the Association of Southeast Asian Nations (ASEAN) or other regional 'good practice' guidelines.

NOTE 2 Burning can be good practice as part of sustainable forest management.

8.3.3 If burning is permitted as described under 8.3.2, the organization shall:

a) demonstrate that the burning took place under controlled conditions, including the provision of sufficient fire-fighting means;

b) document such occasions.

8.4 Waste

8.4.1 The organization shall in accordance with NTA 8080-1:2024, 5.7 take measures to ensure that the practices applied in its operations are aimed at responsible waste management, in which attention shall be paid to:

a) prevention of waste;

b) reuse of waste;

c) separation of waste for recycling

d) recovery of waste other than reuse or recycling;

e) responsible disposal of waste.

8.4.2 The organization shall in accordance with NTA 8080-1:2024, 5.7 take measures to ensure that residues and waste from processes related to the production and processing of agricultural biomass are put to optimum use in order to:

a) prevent unnecessary losses;

b) prevent unnecessary withdrawal of residues and waste from other local functions;

c) prevent an unnecessary burden on the environment.

NOTE 1 See also 8.1.2 and 8.1.3 about residues and waste in relation to soil quality.

NOTE 2 NTA 8080-1:2024, Clause 6 provides requirements to determine whether biomass can be classified as a residue or waste.

9 Competition with food and local applications of agricultural biomass

9.1 If the organization supplies agricultural biomass or makes use of natural resources (e.g. land, water and raw materials) that are essential to the basic needs of the local population, it shall monitor the local prices thereof. In the event of significant increase in prices, the organization shall demonstrate that such increase is not due to its activities.

9.2 In many events, agricultural biomass can be used for different applications (e.g. as raw material for food and materials, and as fuel for energy production). The use of agricultural biomass for energy application needs not to displace their application in food and materials. Biobased raw materials should be used in the most efficient way possible throughout their entire lifecycle. To achieve this, the organization that processes or valorises agricultural biomass shall provide a foundation of the efficient use of these agricultural biomass by describing:

a) the choice of the raw materials used, justifying that use for food and/or materials is not self-evident, based on:

   — environmental considerations;

   — economic considerations;

   — logistic considerations;

   NOTE 1 The degree of justification of the choice of the raw material used is expected to be proportional to the extent of the business operations regarding such material.

b) which measures have been taken in order to use and to continue to use agricultural biomass as efficiently as possible (also known as cascading).

NOTE 2 There are currently several interpretations of cascading, depending on the dimension that is considered (e.g. added value, social needs, raw materials efficiency). The policy framework on cascading has not been fully crystallized yet. That is why the choice has been made in this document to implement cascading by means of reporting requirements as regards raw materials-efficient use, which boils down to efficient use of biobased raw material as a raw material, also considering the final use. Providing a foundation of the measures taken by the organization in order to use raw materials as efficiently as possible contributes to the awareness of such organization and to making data available.

9.3 Within the scope of this document, it is possible to apply 'low ILUC risk'. The organization can opt or may be required to market its agricultural biomass as 'low ILUC risk'. By opting for 'low ILUC risk', the organization shows that the agricultural biomass used do not result in any indirect land-use change (ILUC).

NOTE 1 The underlying philosophy is that the production of agricultural biomass for energy application or application in biobased products on existing arable land does not indirectly lead to conversion of land with high carbon stock and/or high biodiversity values elsewhere that was not previously used for agricultural purposes.

NOTE 2 The requirement to apply 'low ILUC risk' can originate from supplier contracts or other agreements within the sector. For example, it is agreed in the Dutch Energy Agreement that 'low ILUC risk' has to be demonstrated for agricultural biomass originating from new cultivation systems with a short rotation period aiming at producing agricultural biomass for bioenergy, which have been taken into operation after 1 January 2008. Small forest management units are excluded from this requirement in the Dutch Energy Agreement.

9.4 If the organization opts to or is required to market its agricultural biomass as 'low ILUC risk', it shall reduce the risk of ILUC in the agricultural biomass chain by choosing one or more of the following possible solutions:

1) growing biomass on previously unused land;

NOTE 1 Unused land is taken to mean land that does not provide for the delivery of services, i.e. products obtained from ecosystems, including food, fibres, fuel, natural medicines, water and wood. Unused land is also designated as fallow land, degraded land, marginal land or abandoned land.

2) additional productivity increase, on top of the trend line, by actions such as:

— shortening the period that arable land is left fallow;

— intensifying the use of grassland;

— increasing the harvest frequency on arable land;

NOTE 2 The harvest frequency is taken to mean the average number of crops that is harvested on a plot of arable land. The harvest frequency is represented by the multiple cropping index (Beets, 1982).

3) integrating existing agriculture or forestry with additional biomass production;

NOTE 3 For example, stock farming combined with sugarcane production, with the bagasse serving as animal feed, additional crops in double cultivation with existing crops.

4) use of residues and waste that had no other application before.

9.5 The organization shall visualize the measures taken in order to implement the solution(s) provided in 9.4. The organization shall use 1 January 2015 as the reference date, unless a date earlier is required.

Within the framework of Directive (EU) 2018/2001, the organization shall apply the 'low ILUC risk' requirements as described in Annex C.

10 Prosperity

10.1 The organization shall demonstrate that its activities have a positive impact on the average income and the access to infrastructure and basic facilities (e.g. a house, sanitary facilities, education, healthcare, water, energy) in the region concerned.

10.2 The organization shall:

a) have selection criteria for all functions within its organization to which also the local population can conform;

b) demonstrate that local population has been engaged when recruiting new employees;

c) have documented information available about where the employees lived at the time they applied for the job concerned.

10.3 The organization shall organize education and training courses for employees to ensure that they can enter into long-term employment.

10.4 The organization shall:

a) have selection criteria for suppliers that to which also local suppliers, if present, can conform;

b) demonstrate that local suppliers, if present, have been contacted when purchasing products and outsourcing services;

c) have documented information available about all the suppliers of its products and services.

11 Wellbeing

11.1 Working environment

11.1.1 The organization should implement practices with respect to:

— to employment, labour relations, health and safety, training and education, diversity and equal opportunities, and complaints handling in accordance with the latest adopted edition of the Tripartite declaration of principles concerning multinational enterprises and social policy of the International Labour Organization (ILO);

— non-discrimination, child labour, forced and compulsory labour, disciplinary practices, safety practices, the freedom of trade union association and the rights of indigenous peoples in accordance with the Universal Declaration of Human Rights of the United Nations.

In that respect, the organization shall at least conform with requirements of 11.1.2 to 11.1.10.

NOTE Countries which have ratified these declarations are expected to have implemented the provisions in these declarations in their legislation, with which the organization is already required to comply. Companies in these countries can be assumed to comply with the requirements of sections 11.1.2 to 11.1.10, provided that enforcement is also adequately regulated.

11.1.2 The organization shall demonstrate that it does not violate the applicable minimum age thresholds of employees as stated in Table 4.

Table 4 — Minimum ages for performing work

Type of work	Developing countries	Other than developing countries
Light work [a]	12	13
Regular work [b]	14	15
Dangerous/heavy work [c]	16	18

[a] 'Light work' comprises work that does not harm a child's health or development and that does not affect its school attendance, its participation in professional orientation or education programs or its ability to benefit from the instruction it has been given.

[b] 'Regular work' comprises work subject to the condition that the health, safety and morals of the young people concerned are fully protected and that these young people have received an adequate, specific instruction or education in the industry concerned.

[c] 'Dangerous/heavy work' comprises work the nature of which or the conditions under which it is performed are such that this work will probably jeopardize the health, safety and morals of young people.

11.1.3 The organization shall:

a) ensure that the local statutory working hours are not exceeded or, if there are no statutory provisions, that a normal working week, without overtime, is not more than 48 hours;

b) have agreements which state that employees who work overtime do this on a voluntary basis and that they do not work more than twelve hours in overtime a week;

c) have documented information available about the working hours of all employees.

11.1.4 The organization shall ensure that:

a) employees receive a salary with which they have access to the necessities of life;

NOTE The reference is an 8-hour working day.

b) salaries and fees match what is customary in the region.

The organization shall demonstrate that employees receive the salaries agreed and that they do not have to pay premiums for goods or services that are prescribed as compulsory requirements by the employer.

11.1.5 The organization shall:

a) ensure that all employees and hired persons under its control have the competencies and skills to carry out their activities in a responsible way;

NOTE The organization can provide (safety) training courses to all employees on a regular basis, that at least addresses all (safety) aspects corresponding with the activities of the employee, including an exam to verify whether the employee has understand the training course. Supervision can be part of the performance of the activities.

b) ensure that machineries and equipment conform with proper safety requirements;

c) make the right parts and instruments available to employees to do their work safely;

d) make personal protective equipment available to employees to protect them against coming into contact with hazardous substances (via the skin or inhalation), damage to hearing and eyesight, dropping objects ,and other health and safety risks that can occur.

11.1.6 The organization shall have a complaints procedure, including dealing with sexual intimidation and violence, and agreements on handling labour conflicts. The organization shall demonstrate that employees feel free to make use of this complaints procedure and agreements.

11.1.7 The organization shall:

a) ensure that employees feel free to organize themselves in trade unions;

b) in countries where forming trade unions is prohibited by law, not discourage employees from organizing some form of employee representation;

c) voice that an employee representation in countries meant under b) can still come into contact with employers without breaking the law;

d) have a policy to prevent sexual intimidation and violence;

e) ensure that working with the organization is safe for women and that women have the same rights as men;

f) ensure that employees do not feel intimidated by the organization.

The organization shall demonstrate that these procedures and policies have been implemented and that they are effective.

11.1.8 The organization shall at least lay down the following matters in job contracts:

a) the duration of the appointment;

b) the weekly working hours;

c) the salary (per hour or per output delivered);

d) how overtime hours, leave (holiday entitlements) and sickness are handled;

e) premiums and insurance policies;

f) agreements as to maternity leave;

g) reasons for possible dismissal, period of validity and all other relevant rights and obligations of the employee and the employer.

The job contracts shall be drawn up in a language that the employee can understand and shall be explained to the employee by a representative of the employer.

The organization shall demonstrate that its operations conforms to the job contracts.

11.1.9 The organization shall in accordance with NTA 8080-1:2024, 5.7 take measures to effectively fight corruption within the organization.

11.1.10 The organization shall document:

a) the business units that have been studied concerning corruption;

NOTE This study can consist both of a formal risk analysis aimed at fighting corruption and be a risk factor that is part of a general risk analysis.

b) the number and percentage of employees who have taken anti-corruption training courses, divided into managerial and non-managerial positions;

c) the total number of incidents where employees have been subjected to disciplinary measures or have been fired due to corruption;

d) the total number of incidents where contracts with business partners were not renewed due to corruption-related breaches;

e) any corruption-related lawsuits that have been brought against the organization or its employees, the results thereof, and the actions taken in response to these cases.

NOTE The requirements as regards the integrity of the organization are based on the social performance indicators SO2, SO3 and SO4 of GRI. SO2 describes the percentage and the total number of business units studied for risks related to corruption. SO3 describes the percentage of employees who have been trained in the organization's anti-corruption policy and procedures. SO4 describes the actions taken in response to cases of corruption.

11.2 Local community

11.2.1 The organization shall ensure that all the original users of the land that is occupied by the production location are sufficiently informed about the activities planned and the consequences of this. The organization shall provide information about all other matters for which the need is expressed, to the extent that this relates to the activities and does not demonstrably seriously harm the organization's competitive position.

NOTE: In countries or regions where these requirements are adequately covered in permit procedures, organizations are assumed to comply with the requirements of sections 11.2.2 to 11.2.6.

11.2.2 The organization shall:

a) accurately describe the use of the land and unambiguously document the long-term usage rights of the land;

NOTE Examples of long-term usage rights include land rights, customary law, lease or rent agreements.

b) leave control of use and management of the land to the local population that holds the legal right or the right under customary law to decide about the land or to use this land, to the extent that is necessary in order to safeguard their rights and/or sources, unless this population delegates such control to third parties, with free, prior and informed consent, before the commercial operation of the production location starts;

c) take appropriate measures to take away differences of opinion as to decision entitlements and usage rights;

d) neither directly nor indirectly threaten or reduce the local population's sources or rights to decide as a consequence of the management of the land.

11.2.3 The organization shall unambiguously and in consultation with the local population identify locations that represent a special cultural, ecological, economic or religious interest to the local population and have them recognized and protected by the managers responsible.

NOTE The precautionary principle applies to objects that represent a cultural, ecological, economic or religious value. For the purpose of those objects and in accordance with the scale of the production location, parts of the production location will be designated where no operation takes place and where disturbance due to other activities is minimized. These objects need to be described and, if possible, specified on a map.

11.2.4 The organization shall compensate the local population for the application of their traditional knowledge of the use of plant species or the management systems for land use, where the local population agrees with free, prior and informed consent with the compensation, before the commercial operation of the production location starts.

NOTE The way in which compensation takes place is a matter to be agreed between the organization and the local population.

11.2.5 The organization shall determine and establish prior to and during the commercial operation of the production location as well as when discontinuing the production location the extent to which its operation influences the local population. For this purpose, the organization shall determine what information is needed to properly assess these influences and which authorities and population groups (can) have relevant information.

NOTE Possible influences include health and safety aspects related to the infrastructure, hazardous substances and materials, emissions and secretions, health and disease, involuntary relocation, physical and economic displacement, maintaining livelihood, local culture, socially and culturally defined differences between the sexes, indigenous population groups and cultural heritage.

11.2.6 The organization shall in accordance with NTA 8080-1:2024, 5.7 take measures to:

a) minimize the extent and scale of negative impacts and to maximize the extent and scale of positive impacts;

b) increase the engagement and involvement of the local population including offering equal opportunities for all relevant stakeholders in the region without discrimination;

c) positively influence the local population as regards creating employment, conforming with employee rights, offering a social safety net and promoting the social dialogue (decent work).

NOTE 1 Based on the broadly supported notion that having a job significantly contributes to individuals' health and wellbeing and, as a result, to that of society, ILO has developed the principle of decent work. This principle is based on:

— Creating employment – creating an economy that aims to achieve a good investment climate, entrepreneurship, sufficient education opportunities, creating jobs and a sustainable living environment.

— Honouring employee rights – including ensuring adequate employee representation with sufficient opportunities to participate in these networks and laying down employee rights in legislation and regulations.

— Offering a social safety net – providing a safe working environment, sufficient free time, observing family and social values and providing adequate compensation for situations where income becomes less or is lost. And besides this, providing a properly functioning healthcare system.

— Promoting the social dialogue – involving strong and independent employee representations, which is crucial for increasing productivity, preventing disputes and building a coherent society.

The ILO has ‘Decent work country programs’ for various countries.

NOTE 2 The requirements regarding the contribution to the wellbeing of the local population are based on the SO1 social performance indicator of GRI. SO1 describes the nature, scope and effectiveness of any program or practice that assesses and manages the impact of the activities on communities.

Annex A
(normative)

Stakeholders consultation

A.1 General

This annex describes the requirements for the stakeholders consultation, including the organization of the consultation, the sustainability aspects to be addressed, and the exemptions to execute a stakeholders consultation.

A.2 Organization of stakeholders consultation

A.2.1 For the purpose of an effective and adequate contribution of stakeholders to the stakeholders consultation, the organization shall:

a) identify and register national and local stakeholders and invite them to participate in the stakeholders consultation;

b) enter into consultation with the stakeholders who have been identified and have stated that they are willing to participate in such consultation;

c) consult every stakeholder or group of stakeholders identified as often as necessary, but at least once every five years;

d) ensure that the stakeholders are informed about all matters for which the need is made known, unless this demonstrably seriously affects the organization's competitive position;

e) take measures in order to solve any substantive differences of opinion with stakeholders.

A.2.2 The organization shall document the outcome of the stakeholder consultation.

A.3 Relevant sustainability aspects

The stakeholder consultation shall at least cover the following sustainability aspects, to the extent that they are applicable:

a) establishing locally produced or available agricultural biomass or local natural resources that are essential to the basic needs of the local population (see also 11.2);

b) establishing the areas, within the organization's span of control, that are considered to be high conservation value areas (see also Clause 7);

NOTE The organization's span of control relates to the area (and the stakeholders in the area) where changes occur due to the activities to be carried out by the organization. These changes can be both tangible, due to changes in land use and the installation and construction of infrastructure and buildings, and intangible, due to changes taking place in the relationships between the local population and the organization.

c) establishing local essential functions of residues and waste that are released when producing and processing agricultural biomass from agriculture, aquaculture, fishery or forestry (see also 8.1.2);

d) establishing which parties obtain control of the land use and management in the area where the production location is or will be established and what the extent of such control will be (see also 11.2);

e) enlarging the involvement of the local population (see also 11.2.6).

A.4 Exemptions of executing a stakeholders consultation

The organization can be entirely or partly exempted from executing a stakeholders consultation, if the following requirements can be fulfilled:

— if (parts of) the sustainability aspects in Clause A.2 have been laid down in laws and regulations, established by local and/or national governments in the country of establishment of the production location, for which the organization shall demonstrate that the laws and regulations concerned have been complied with;

— if (parts of) the sustainability aspects in Clause A.2 are incorporated in a permit procedure, established by local and/or national governments in the country of establishment of the production location and including a complaints procedure and/or a procedure for lodging objections, for which the organization shall demonstrate that these sustainability aspects have been addressed.

NOTE 1 To conduct a stakeholder consultation, the organization can use the guidance in 'How to execute a stakeholder consultation? A guidance note' (NL Agency).

NOTE 2 In case of free, prior and informed consent, the organization can use guidance, such as 'Guide to Free Prior and Informed Consent' (Oxfam) or 'Guidelines on Free, Prior and Informed Consent' (UN-REDD Programme).

Annex B
(normative)

Specific requirements for forest biomass

B.1 General

B.1.1 This annex provides specific requirements for forest biomass within the framework of Directive (EU) 2018/2001 with respect to the assessment of compliance with the sustainability criteria on forest biomass, as set out in Article 29.6 and 29.7 of Directive (EU) 2018/2001. This Directive includes two sets of sustainability criteria for forest biomass:

1. One in Article 29.6 which aim is to minimise the risk of using forest biomass derived from unsustainable production.
2. One in Article 29.7, which aim is to ensure compliance with Land use, Land-use Change and Forestry (LULUCF) requirements.

Compliance with these forest biomass criteria shall be demonstrated by using a risk based approach, which shall take into account the national or subnational legislation and enforcement systems.

The forest biomass criteria are fulfilled at national or sub-national level ("level A") when legislation defined in Article 29(6a) and 29(7a) are in place. However, for any of these criteria at level A for which compliance cannot be demonstrated at national or sub-national level, economic operators will need to demonstrate compliance at the forest sourcing area level ("level B").

The following clauses in this annex provide specific ways to demonstrate compliance with the sustainability criteria on forest biomass, as set out in Article 29.6 and 29.7 of Directive (EU) 2018/2001.

— Clause B.4: Demonstrating compliance with the harvesting criteria through national and sub-national laws and monitoring/enforcement systems (level A);

— Clause B.5: Demonstrating compliance with the harvesting criteria through management systems at the sourcing area level (level B);

— Clause B.8:2 Demonstrating compliance with the LULUCF criteria through national and sub-national laws and monitoring/enforcement systems (level A);

— Clause B.8.3: Demonstrating compliance with the LULUCF criteria through management systems at the sourcing area level (level B).

Clauses B.3, B.4, B.5, B.7 and B.8 are based on the REDIIBIO – final report.

B.2 Harvesting criteria

B.2.1 Biofuels, bioliquids and biomass fuels produced from forest biomass taken into account for the purposes referred to in points (a), (b) and (c) of subparagraph 1 of Article 29 of Directive (EU) 2018/2001 shall meet the following criteria to minimise the risk of using forest biomass derived from unsustainable production:

B.2.2 The country of harvest and, where applicable, the sub-national region where the forest biomass was harvested, including the sourcing area shall have national or sub-national laws applicable to the area of harvest, which ensure:

i) the legality of harvesting operations;

ii) forest regeneration of harvested areas;

iii) that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including in wetlands and peatlands, are protected;

iv) that harvesting is carried out considering maintenance of soil quality and biodiversity with the aim of minimising negative impacts; and

v) that harvesting maintains or improves the long-term production capacity of the forest;

B.2.3 Where evidence referred to in B.2.2 is not available, the biofuels, bioliquids and biomass fuels produced from forest biomass taken into account for the purposes referred to in points (a), (b) and (c) of subparagraph 1 of Article 29 of Directive (EU) 2018/2001 shall have management systems in place at forest sourcing area level ensuring:

i) the legality of harvesting operations;

ii) forest regeneration of harvested areas;

iii) that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including in wetlands and peatlands, are protected unless evidence is provided that the harvesting of that raw material does not interfere with those nature protection purposes;

iv) that harvesting is carried out considering the maintenance of soil quality and biodiversity with the aim of minimising negative impacts; and

v) that harvesting maintains or improves the long-term production capacity of the forest.

B.3 Relevant concepts for demonstrating compliance with the harvesting criteria

This section explains the relevant definitions related to the harvesting criteria set out in Article 29.6 of Directive (EU) 2018/2001, in addition to the definitions provided in NTA 8080-1, chapter 3.

B.3.1 National or sub-national laws applicable in the area of harvest

For level A compliance, the harvesting criteria need to be fulfilled at national level, for the country where the biomass was harvested. Laws, enforcement and monitoring systems can be a national, or a sub-national competence. In the latter case, such sub-national areas are referred to as regions. All regions shall comply with a criterion for a country to be considered to pass it at “level A”. The regional level can be referred to differently depending on the country. In federal countries, such as for example Austria (10 Länder), Belgium (3 regions), Canada (10 provinces), Germany (16 Bundesländer) and the United States of America (US, 50 states), or in decentralized countries such as for example Spain (17 regions) and Italy (20 regions), important parts of the legislative power in the area of forestry have been transferred from the country level to the sub-national level. It shall be noted that different laws may apply for different types of forest ownership. For example, private forests in the US are regulated at State level, while federally owned forests are regulated through federal (national) legislation.

B.3.2 Monitoring and enforcement systems

REDII requires **monitoring and enforcement systems** to be in place for all five harvesting criteria. **Monitoring systems** assess the correct implementation of the legislation through various possible forms of assessment (for example: field checks, inventory, remote sensing), while **enforcement systems** seek to remedy infringements of the legislation. Enforcement systems can include sanctions and other mechanisms designed to punish (enforcement through deterrence), as well as remedial actions to bring a private or economic actor into compliance (enforcement through cooperation). Mandated competent authorities that monitor and enforce adherence to legislation in the area of harvesting and forest management are typically ministries responsible for forest, national forest agencies, forest directorates, nature protection agencies etc.

The monitoring and enforcement criteria may be considered satisfied when:

a) The relevant legislation includes mandatory monitoring and enforcement provisions, including that a competent authority to monitor and enforce legislation is specified in relevant legislation as well as sanctions which are enforced in case of infraction (source of information would be relevant national laws/regulations); and
b) There is no substantiated alert or evidence from international or national governmental organizations of a *significant* and a *systematic* lack of enforcement, caused for instance by widespread corruption of forest enforcement authorities or continued unaddressed illegality.

Possible sources of information are reports from international government organisations, such as the UNEP-WCMC briefing notes for third countries, or the Commission infringement procedures for EU Member States, as well as national governmental sources. In the context of the legality criterion, the EU Member States have implemented the EU Timber Regulation (EUTR, Regulation EU 995/2010), for which they have mandated a variety of public agencies to perform checks on operators and monitoring organizations. This is done to ensure that they fulfil their obligations under the EUTR, and to sanction if obligations would not be fulfilled. According to the EUTR, the placing on the market of illegally harvested timber or timber products derived from such timber is prohibited. Operators shall exercise due diligence when placing timber or timber products on the market and through adequate due diligence ensure negligible risk of illegally harvested timber or timber products entering the market. The EUTR requires Member States to lay down the rules on penalties applicable to infringements of the provisions of the regulation. The well-functioning of the EUTR itself is also being monitored and transparently reported through regular monitoring and review processes. Ultimately the EU can launch infringement procedures against a Member State that has demonstrated lacking implementation of the regulation.

B.3.3 Management system

The term '**management system'** means an information management system run by an economic operator to demonstrate that biomass sourcing is in compliance with the sustainability criteria at forest sourcing area level defined in Articles 29.6(b) and 29.7(b) of Directive (EU) 2018/2001. The management system shall document management practices with relevance to the sustainability criteria (as further described in this annex) that have been and are planned to be applied by forest managers/owners in the sourcing area. The management system is thus not to be confused with a forest management system, as in most cases the economic operator will have no legal power or mandate to manage the forests where it sources the biomass from.

The management system shall ensure that information necessary to demonstrate compliance with all sustainability criteria through a risk-based approach is collected, verified, assessed, securely stored by the economic operator and appropriately passed down the supply chain using a mass balance chain of custody (see Chapter 4). The system needs to be accurate, reliable and protected against fraud,

including verification ensuring that materials are not intentionally modified or discarded so that consignments or part thereof could become a waste or residue (REDII Article 30.3).

Stepwise approaches such as specified in B.5, help to define the information requirements, identify available information sources, and assess the available information.

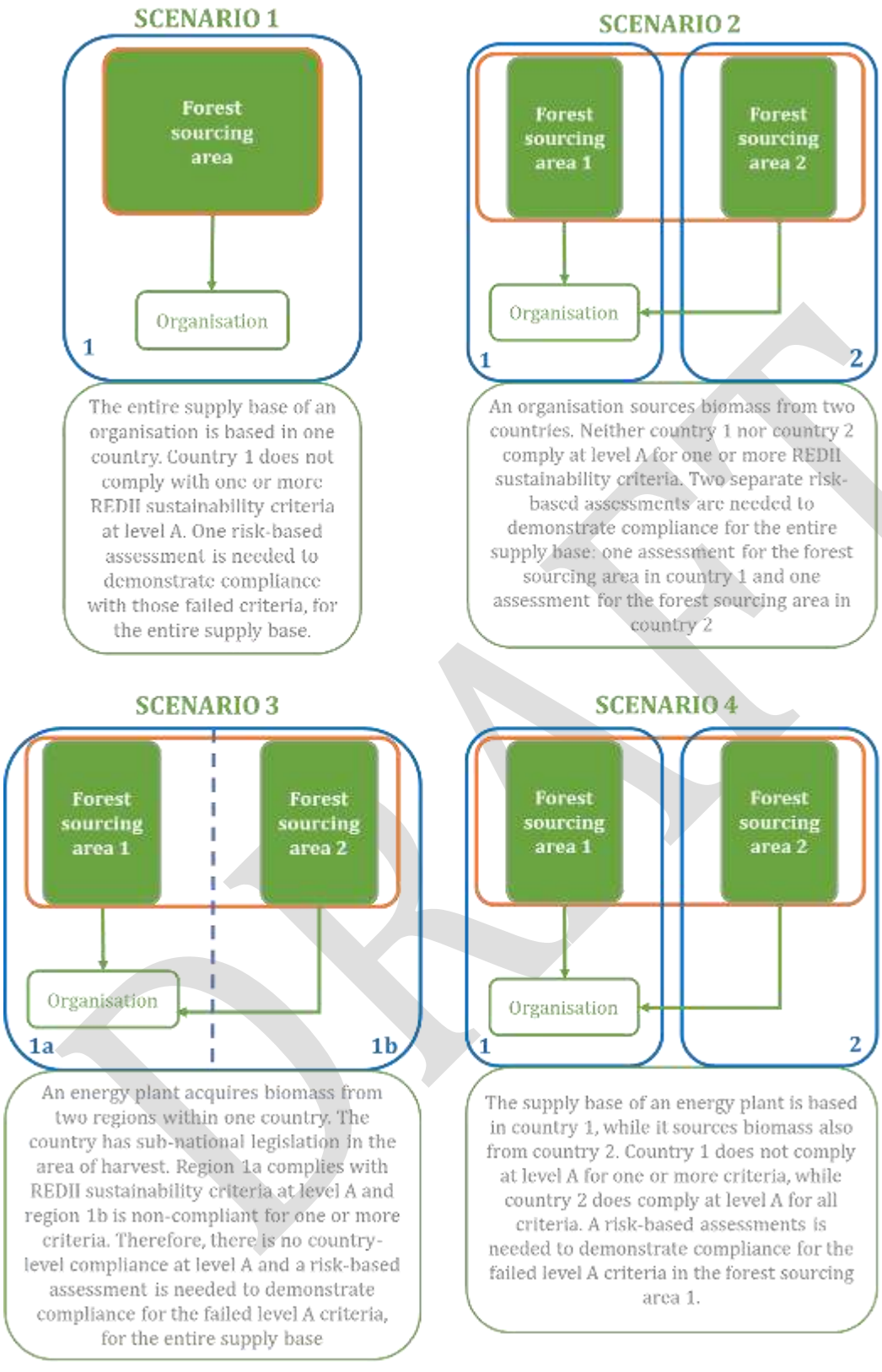
B.3.4 Sourcing area

According to Article 2(30) of Directive (EU) 2018/2001, the term **'sourcing area'** is defined as "*the geographically defined area from which the forest biomass feedstock is sourced, from which reliable and independent information is available and where conditions are sufficiently homogeneous to evaluate the risk of the sustainability and legality characteristics of the forest biomass*". This definition implies:

- A "*geographically defined area*" means that the area of origin from which the forest biomass feedstock is harvested, is known and can be shown on a map, typically on the basis of administrative boundaries.
- "*From which reliable and independent information is available*" means that the Information required to assess compliance with the REDII criteria is available from competent organizations, public or private, which have the legal mandate to produce reliable information. For public forests this could concern the competent forest management authority. For private forests, this could concern e.g. forest extension organisations, or those directly responsible for the forest management.
- "Where conditions are sufficiently homogenous to evaluate the risk of the sustainability and legality characteristics of the forest biomass": this means that within the administrative area, the set of legislative conditions covering the elements of the sustainability criteria, shall be the same (e.g. regions as corresponding to ISO 3166-2). If an economic operator's supply base spreads over two countries or regions where the elements addressed in REDII are governed through different sets of legislation, then that results in two separate sourcing areas for which the risk-based approach would have to be implemented separately. The supply base comprises the sourcing area or assembly of all sourcing areas from which a biomass operator sources its forest biomass feedstock.

Figure B.1. shows four examples of different scenarios for the division of an operator's supply base into sourcing areas.

Figure B.1. Examples of sourcing areas



NOTE: the location of the bioenergy plant does not affect the compliance requirements – it can be located within a sourcing area or outside the sourcing areas.

B.3.5 Legality of harvesting operations

In line with the EUTR, the term **'legality of harvesting operations'** means that forest biomass harvesting activities shall comply with applicable legislation in force in the country of harvest. This includes the following requirements:

- Rights to harvest timber within legally gazetted boundaries;
- Payments for harvest rights and timber including duties related to timber harvesting;
- Timber harvesting, including environmental and forest legislation including forest management and biodiversity conservation, where directly related to timber harvesting;
- Third parties' legal rights concerning use and tenure that are affected by timber harvesting;
- Trade and customs, in so far as the forest sector is concerned.

For complete and legally applicable information concerning EUTR compliance requirements, please refer to the Commission implementing Regulation (EU) No 607/2012 of 6 July 2012 on the detailed rules concerning the due diligence system and the frequency and nature of the checks on monitoring organizations, the guidance documents as well as to the country risk profiles available on the Commission website.

B.3.6 Forest regeneration of harvested areas

The REDII defines the term **'forest regeneration'** as the '*re-establishment of a forest stand by natural or artificial means following the removal of the previous stand by felling or as a result of natural causes, including fire or storm*' (Article 2.31 of Directive (EU) 2018/2001). Some of the possible scenarios are described in the following examples:

- **Example 1:** A final cut was applied to a forest stand and the biomass was removed. Seed trees are left from the previous tree generation, which will form the foundation from which the new forest will establish;
- **Example 2:** A forest was harvested. On the site no seedlings exist. The forest is regenerated through planting of seedlings originating from a tree nursery.

In the spirit of the REDII sustainability criteria, highly biodiverse forests cannot be converted into forest stands that would in one rotation evolve into stands of significantly lower biodiversity values. Land-use change, i.e. a conversion from forest to another land-use type, would imply that the forest regeneration criterion cannot be fulfilled.

B.3.7 Areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands

The term **'designated areas'** means land areas – which can include wetlands and peatlands – that are managed for nature protection purposes. The geographical boundaries of the protected areas need to be clearly defined. In case biomass extraction would be permitted, it can only be done with official approval that the intervention would comply with the nature protection purposes and management objectives of the area (see item iii of B.2.3).

Designated areas can be classified according to management or protection objective categories, either following official national or sub-national classifications, and/or following the classification system of the International Union for Conservation of Nature (IUCN): (Ia) strict nature reserve; (Ib) wilderness area; (II) national park; (III) natural monument or feature; (IV) habitat/species management area; (V) protected landscape/seascape; and (VI) protected area with sustainable use of natural resources. IUCN maintains the World Database on Protected Areas (WDPA). This most comprehensive global database on protected areas contains information on location and boundaries of protected areas, legal status and other indicators.

Several other international networks of designated areas exist, e.g. the UNESCO Biosphere Reserves promote solutions reconciling the conservation of biodiversity with its sustainable use. There are currently 701 biosphere reserves in 124 countries, including 21 transboundary sites, that belong to the World Network of Biosphere Reserves. Biosphere reserves are nominated by national governments and remain under the sovereign jurisdiction of the states where they are located. Biosphere Reserves are designated under the intergovernmental MAB Programme by the Director-General of UNESCO following the decisions of the MAB International Coordinating Council (MAB ICC). Their status is internationally recognized.

Areas designated by international or national law or by the relevant competent authority for nature protection purposes, including in wetlands and peatlands, are protected unless evidence is provided that the harvesting of that raw material does not interfere with those nature protection purposes

The requirement that 'harvesting (…) **does not interfere with nature protection purposes'** means that harvesting is only allowed if the intervention does not contravene, or helps to achieve or maintain the nature protection purposes. In case harvesting is lawfully carried out in a designated area, it must meet the protection requirements of the designated site.

The objectives of habitat specific or species-specific nature protection legislation need to be complied with in order to avoid detrimental impacts of harvesting regarding any such objectives. To this end, it has to be assessed if designated areas are included in the sourcing area. Means of verification can include country-specific information systems on nature protection or international sources such as the IUCN World Database on Protected Areas (WDPA), a comprehensive global database on terrestrial and marine protected areas.

For example, the Habitats Directive 92/43/EEC 25 for the conservation of natural habitats and of wild fauna and flora has established the so-called Natura2000 network of protected habitats. In these areas, forest harvesting has to be carried out in such a way that it meets the requirements of the designated site26. Another example of when harvesting could be implemented on a protected site is when for phytosanitary reasons the removal of infected trees will safeguard the remaining forest, or when the removal of trees creates a more structurally diverse landscape.

Harvesting is carried out considering maintenance of soil quality and biodiversity with the aim of minimising negative impacts

The term **'maintenance of soil quality'** means keeping the physical, chemical, biological and ecological state of the soil after an intervention at comparable level to before the harvesting intervention. A simple method for maintaining the forest soil nutrient balance is to exclude residue harvest on poor or vulnerable soils (according to local soil maps and guidelines); and that harvest and extraction of foliage is omitted.

The JRC European Soil Data Centre defines soil quality as "an account of the soil's ability to provide ecosystem and social services through its capacities to perform its functions under changing conditions".

'Minimising negative impacts' means keeping soil disturbance due to harvesting to a minimum by applying a site-suitable harvesting system and preventing soil erosion, while allowing established sustainable forestry practice. Low-impact harvesting can for example be implemented by extracting the biomass via purpose-specific cableways in order prevent erosion on steep slopes or in the vicinity of waterways30. Furthermore, forests on wet soils that are easily compacted by heavy machinery could be harvested e.g. by applying low harvesting impact techniques or in winter when the ground is frozen. Heavy machinery for logging or extracting timber should not be used in situations when that would result in irreversible damage to soil structure and productive capacity.

The term **'maintenance of forest biodiversity'** means that genetic and diversity of animal and plant species is unharmed during an intervention or can establish again after an intervention. This would include measures directly targeted at the conservation of habitats and species or indirectly by ensuring species can re-establish. This leads to consider e.g. genetic diversity and species richness that relate to the dominant plant and animal species that characterize a given forest ecosystem, while also vegetation structure (height, density, complexity) and age of the trees play an important role. Protecting and restoring biodiversity serves to maintain resilience in forests, in time and space.

'**Minimising negative impacts**' requires that biodiversity and habitat features are identified (e.g. habitat features for rare and endangered species, features and prevalent species with a high biodiversity value), and that harvesting operations are planned in such manner that these features are left unharmed or their establishment encouraged as much as possible. Measures could include exclusion of rare tree species from harvesting, maintaining a minimum amount of standing and laying deadwood of mature dimensions or a prohibition of harvesting during breeding season.

B.3.8 Long-term production capacity of forests

The term **'long-term production capacity'** refers to the ability of forest land to sustainably deliver products (such as wood of various quality grades, and non-wood-forest products) and services (such as forest recreation, air and water purification) over a long period of time, bridging several successive forestry rotations. A single forestry rotation lasts in duration from the forest regeneration to the final logging event, which can be 20 years for coppice and some fast-growing plantation species or up to 100 years and more in forests for the production of quality sawn timber.

The production capacity of forests is influenced by the tree species, variety and provenance, and climate and soil quality (determined by among others mineral composition, texture, nutrients, organic matter, soil moisture). But also, forest management influences the extent and condition (amount and quality) of ecosystem services that a forest can deliver. For example, it can impact the amount of wood and/or the amount of non-wood forest products.

Under sustainable harvesting intensity, the impact of forest harvesting on the forest production capacity will be low to non-significant when either the nutrient-rich foliage is left behind on the harvesting site, or that after ashes resulting from wood-based bio-energy production are returned to the forest in a way that nutrients are slowly released back into the ecosystem. It is to be noted that the impact of harvesting on the long-term production capacity depends strongly on local soil conditions. Long-term studies are not available in sufficient numbers to conclude clear implications of residue harvesting on long-term productive capacity.

A typical indicator for maintenance of the long-term production capacity, at country level or at forest sourcing area level, is that the harvested biomass should not exceed the net annual increment. An estimate of the net annual increment (NAI) of the forest - i.e. the net amount of stem wood that grows over a year's time - determines the maximum volume of wood that timber companies can harvest without endangering future possible harvesting levels. A maximum annual allowable cut (AAC) can be country-specific or applicable to smaller areas. This AAC is a very basic guidance to help maintain the long-term production capacity of the forest in a country. Estimates of NAI and AAC can be derived from national forest inventory data or yield tables for example, or they can be prescribed by a local forest management authority.

Forest biomass that results from salvage logging after natural disturbances will need to be taken into account when reporting the harvesting and increment levels. Temporary higher harvesting levels due to natural disturbances and salvage logging operations in an area must be justified and compensated for in the long term.

B.4 Stepwise approach for demonstrating compliance through national or subnational laws (level A)

The main process for the level A assessment shall follow the two steps as described below, where each step will be repeated for each criterion as specified in B.2.2.

Step 1: Assessment if laws/regulation is in place:
For each criterion within the sustainable harvesting criteria a check is done if legislation is in place in the country covering that criterion. This could be either in specific forest legislation (e.g. forest laws mentioning need for regeneration) or more environmental legislation (e.g. identifying and limiting activities in protected areas).

Several countries are organized in such a way that several topics of legislation are not nationally regulated but regionally (for example Belgium, Italy or Germany). In those cases, a country as a whole can only pass the criterion if legislation is present in each underlying region to comply with that criterion. So, in these cases, all underlying regions would need to be reviewed for relevant legislation, or the presence of an overarching framework with the criterion is present.

As it would be beyond the legal requirement of REDII, which only requires active legislation to address the criteria topic, this step does not require to assess the effectiveness of the laws (e.g. if the regulation on the longer term actually obtains the objective of the criteria in the manner the regulation is currently formulated). The assessment only aims to identify whether laws exist that explicitly or implicitly aim to achieve the criteria and sub-criteria. In this assessment the concept the criterion covers, needs to be identified in legislation, regulation or underlying technical codes. It could be in different terminology, as long as the essence is the same and regulation is in place to safeguard the criteria. Since sustainable forest management is detailed differently in different countries (influenced by management practices, climate impacts and forestry types), the details of the regulations are not prescribed or included in the assessment. The main objective is to identify countries which are 'low risk', because they have legislation and monitoring/enforcement in place covering the forest sustainability criteria. It is the responsibility of the country to identify which sustainable management practices and resulting regulatory details are suitable for their specific forests.

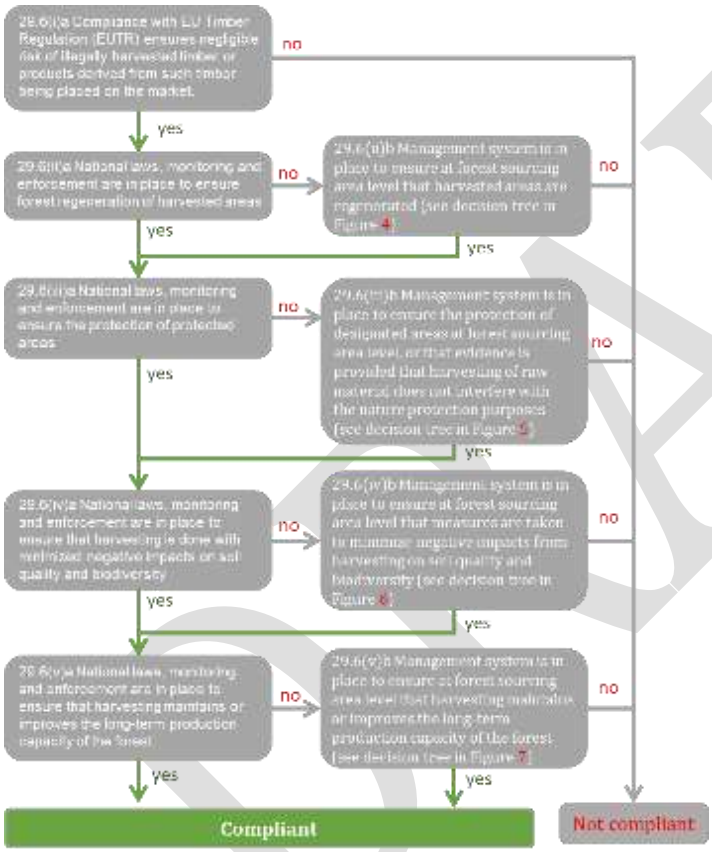
Step 2: Assessment of monitoring and enforcement in place:
Once relevant legislation has been identified that covers the criteria, in a following step a review shall be done to ensure that monitoring and enforcement systems are in place and that there is no evidence of a significant and systematic lack of enforcement. This step comprises of the following elements:

- Check if for each of the identified national or sub-national laws/regulations as identified in the first step, monitoring and enforcement provisions, including sanctions are detailed in the regulations;
- Check the absence of robust evidence of significant and systematic lack of enforcement. This is done by:
    - Review if there is an ongoing infringement procedure by the European Commission against the country in any field relevant to the criteria (e.g. illegal logging, insufficient conservation of protected areas). If there is an active infringement procedure, the enforcement element of the criteria will be set to No and thus the criterion regarded as non-compliant;
    - Secondly, review the UNEP-WCMC "*briefing notes on the implementation of the EU Timber Regulation*" of the past two years to check for any mention of serious offenses. If these are mentioned, it is important to review if the briefing notes later report that the issues have been resolved. These briefing notes consider forest sector governance broadly so its reporting can be of relevance for the assessment of any of the sustainable harvesting criteria. If offenses were reported in these briefing notes, the description of these offenses can be used to assess for which criteria enforcement will be set to No. If the comment indicates '*corrupt or dysfunctional forest governance*' or a similar statement, all criteria on sustainable harvesting will be set to No;

- Any other evidence from (international) governmental organisation can be used to substantiate a lack of compliance once this evidence is recent and structural.

Several country sheets were developed as examples/test cases of the methodology within the REDIIBIO project. The country sheets have been used to carry out a legal analysis the compliance of the existing relevant legislations in 32 countries with the forest sustainability criteria (the level A route - compliance on a national/subnational level). The country sheets do not hold any legal value and were solely used for the purpose of testing the methodology developed for the level A. Findings from the development of the country sheets were used to improve the level A methodology in case relevant. The 32 countries considered are 27 EU Member States and five countries (or a subset of regions in that country) outside the EU which have been selected based on their current role in supplying forest biomass products to Europe: Russia, USA, Canada, Ukraine and Belarus.

Figure B.2. Decision-tree for demonstrating compliance with the harvesting criteria through national or sub-national legislation



Note: The numbers between brackets refer to the harvesting criteria from Article 29 (6) of Directive (EU) 2018/2001 as specified in B.2.2. The textboxes on the left concern the country level criteria (level A) and the text boxes on the right concern the criteria at the level of the forset sourcing area (level B).

Table B.1 provides a checklist of types of proof and possible information sources to demonstrate sustainability compliance at level A. However, note that the checklist does not specify benchmark requirements that would allow qualitative assessment of a country's laws, as the latter is outside the scope of REDII requirements.

NOTE Countries (e.g. European Member States) can establish public databases with up-to-date information in order to minimize the administrative burden for organizations.

Table B.1 — Checklist for demonstrating compliance with the harvesting criteria through national or sub-national laws (source: REDIIBIO – Final report)

Harvesting criteria	Type of evidence/verified information		Possible information sources
Harvesting legality (B.2.2, item i)	Laws	Adequate and efficient due diligence as required under the EU Timber Regulation (EUTR, (EU) 995/2010) has determined negligible risk of illegal logging	Legislation in the area of forestry can be checked from national official legislation journals and databases or from the UN-FAO FAOLEX database of national legislation, policies and bilateral agreements on environment, forestry, land & soil, agriculture and natural resources management, amongst other. http://www.fao.org/faolex
Harvesting legality (B.2.2, item i)	Monitoring/ Enforcement	Proof that there is no evidence from national or international governmental organizations that there is significant and continued lack of enforcement NOTE: NGO based sources shall be included only indirectly (for example through the UNEP-WCMC briefing notes) as to ensure a quality check has taken place on the information in these sources and ensuring no conflicting findings and outcomes.	The UNEP-WCMC briefing notes on EUTR implementation: www.unepwcmc.org/featured-projects/eu-timber-regulations-and-flegt
		Evidence that the relevant Member State is not subject to any ongoing EU infringement procedure for non-compliance with the EU Timber Regulation	Legislation in the area of forestry can be checked from national official legislation journals and databases or from the UN-FAO FAOLEX database of national legislation, policies and bilateral agreements on environment, forestry, land & soil, agriculture and natural resources management, amongst other. http://www.fao.org/faolex
Forest regeneration	Laws	Legal analysis showing that the relevant legislation complies with	Legislation in the area of forestry can be checked from official national legislation journals and databases or

(B.2.2, item ii)		the forest regeneration criteria	from the UN-FAO FAOLEX database of national legislation, policies and bilateral agreements on environment, forestry, land & soil, agriculture and natural resources management, amongst other. http://www.fao.org/faolex
Forest regeneration (B.2.2, item ii)	Monitoring/ Enforcement	Legal analysis showing that the relevant forest legislation includes monitoring and enforcement requirements for forest regeneration	Legislation in the area of forestry can be checked from official national legislation journals and databases or from the UN-FAO FAOLEX database of national legislation, policies and bilateral agreements on environment, forestry, land & soil, agriculture and natural resources management, amongst other. http://www.fao.org/faolex
		Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement	The UNEP-WCMC briefing notes on EUTR implementation: www.unepwcmc.org/featured-projects/eu-timber-regulations-and-flegt. Other recent and relevant official information from national governmental or international inter-governmental sources, such as World Bank, FAO, UNEP.
Protected areas (B.2.2, item iii)	Laws	Legal analysis showing that the relevant legislation complies with the protect areas requirement	Legislation in the area of forestry can be checked from official national legislation journals and databases or from the UN-FAO FAOLEX database of national legislation, policies and bilateral agreements on environment, forestry, land & soil, agriculture and natural resources management, amongst other. http://www.fao.org/faolex European Environment Agency Common Database on Designated Areas for all its 36 member countries. https://www.eea.europa.eu/data-and-maps/data/nationallydesignated-areas-national-cdda-14 World Database on Protected Areas (WDPA), including reports on the effective management of protected areas for most countries in the World.

			http://www.protectedplanet.net
Protected areas (B.2.2, item iii)	Monitoring/ Enforcement	Legal analysis showing that the relevant forest legislation includes monitoring and enforcement requirements for protected areas	Legislation in the area of forestry can be checked from official national legislation journals and databases or from the UN-FAO FAOLEX database of national legislation, policies and bilateral agreements on environment, forestry, land &soil, agriculture and natural resources management, amongst other. http://www.fao.org/faolex
		Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement	The UNEP-WCMC reports on EUTR implementation: www.unepwcmc.org/featured-projects/eu-timber-regulations-and-flegt World Database on Protected Areas (WDPA), including reports on the effective management of protected areas for most countries in the World. http://www.protectedplanet.net Other recent and relevant official information from national governmental or international inter-governmental sources, such as World Bank, FAO, UNEP.
Maintenance of soil quality and biodiversity (B.2.2, item iv)	Laws	Legal analysis showing that the relevant legislation complies with the maintenance of soil quality and biodiversity criteria	Legislation in the area of forestry can be checked from national legislation databases or from the UN-FAO FAOLEX database of national legislation, policies and bilateral agreements on environment, forestry, land &soil, agriculture and natural resources management, amongst other. http://www.fao.org/faolex
Maintenance of soil quality and biodiversity (B.2.2, item iv)	Monitoring/ Enforcement	Legal analysis showing that the relevant forest legislation includes monitoring and enforcement requirements for protected areas	Legislation in the area of forestry can be checked from national legislation databases or from the UN-FAO FAOLEX database of national legislation, policies and bilateral agreements on environment, forestry, land &soil, agriculture and natural resources management, amongst other. http://www.fao.org/faolex

		Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement	The UNEP-WCMC reports on EUTR implementation: www.unepwcmc.org/featured-projects/eu-timber-regulations-and-flegt Other recent and relevant official information from national governmental or international inter-governmental sources, such as World Bank, FAO, UNEP
Long-term production capacity (B.2.2, item v)	Laws	Legal analysis showing that the relevant legislation complies with the long-term production capacity criteria	Legislation in the area of forestry can be checked from national legislation databases or from the UN-FAO FAOLEX database of national legislation, policies and bilateral agreements on environment, forestry, land &soil, agriculture and natural resources management, amongst other. http://www.fao.org/faolex
Long-term production capacity (B.2.2, item v)	Monitoring/ Enforcement	Legal analysis showing that the relevant forest legislation includes monitoring and enforcement requirements for long-term production capacity	Legislation in the area of forestry can be checked from national legislation databases or from the UN-FAO FAOLEX database of national legislation, policies and bilateral agreements on environment, forestry, land &soil, agriculture and natural resources management, amongst other. http://www.fao.org/faolex
		Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement	The UNEP-WCMC reports on EUTR implementation: www.unepwcmc.org/featured-projects/eu-timber-regulations-and-flegt Other recent and relevant official information from national governmental or international inter-governmental sources, such as World Bank, FAO, UNEP

B.5 Stepwise approach and checklists for demonstrating compliance through management systems at the sourcing area level (level B)

This section provides the approach to demonstrate compliance with the harvesting criteria as specified in B.2.2) at the forest sourcing area level (level B). These compliance checks have to be implemented at forest sourcing area level only for those criteria for which level A evidence could not be provided. This section presents a stepwise approach for each criterion, followed by the summarizing checklist with specific indicators and sources for verification of the indicators. The

checklists were prepared based on a review of best practices applied in the industry. Given that legal systems, silvicultural approaches and available information approaches and sources differ considerably between countries and regions, the checklists are not exhaustive.

(i) Legality criterion
As mentioned in preceding sections, any wood and products made of wood that are placed on the EU market, need to comply with EUTR requirements. The procedure to comply with the legality criterion is to be the same for level A and level B. For further clarification on the link between REDII and EUTR see B.2.2 on (i) Legality of harvesting operations. For a summary guidance on compliance with the REDII legality criterion, see B.4 ~~Section 2.2.3~~.

The following guidance therefore applies to the harvesting criteria (ii) to (v).

(ii) Regeneration criterion
Figure B.3 shows the stepwise approach for demonstrating compliance with the **regeneration criterion**.

Key steps include:

Step 1.1: The economic operator shall identify whether the forest biomass results from final felling, clearcutting or selective logging, or from a calamity (such as storm, fire, or for phyto-sanitary reasons to prevent the spread of biotic pests and diseases). In this case, regeneration is required.

Step 1.2: When biomass results from thinning or from the pruning of trees, then regeneration would not be an issue and the biomass would be considered automatically compliant with the criterion. Thinning means a reduction of the number of stems to give more space for the crowns of the main trees of interest to develop to maturity. This is undertaken while maintaining a maximum possible tree cover, not leading to forest degradation and instead ensuring quantity and quality of next generation forest resources.

The information to assess these first steps should be specified in forest management plans/operational reports/harvest protocols by specifying the type of forest operation from which forest biomass stems from (e.g. final felling, thinning, salvage cuttings). The information must be specified for each stand individually. The relevant information could be obtained e.g. from the forest owner directly, or from a competent authority that compiles such information from forests within the sourcing area.

*Step 2***:** If regeneration is required, the operator shall provide evidence to make sure that regeneration will be carried out in an appropriate manner. This means that it is implemented either through natural regeneration, planting and seeding, or coppice regrowth. Also, evidence is required that forest regeneration is done in a manner that ensures quantity and quality of next generation forest resources. This also means that forest composed of site-natural species shall not be replaced with non-site natural plantations (e.g. site-natural forests will not be replaced by agriculturally managed monocultural plantations). Regeneration should be implemented at least within five years upon timber harvesting, unless otherwise required by the applicable legislation. This to have a limited time period without forest cover, ensuring the maintenance of forest productivity as well as the carbon sink.

This information required in this step should be available from forest management plans. These shall include a regeneration goal regarding species composition and establishment period, as well as identified measures to prevent abiotic and biotic hazards. The information must be specified for any stand individually. The information could be obtained e.g. from the forest owner directly, or from a competent authority that compiles such information from forests within the sourcing area.

Table B.2 presents the checklist for demonstrating compliance with the regeneration criterion, including indicators and related sources of information.

Figure B.3. Stepwise approach for demonstrating compliance with the regeneration criterion

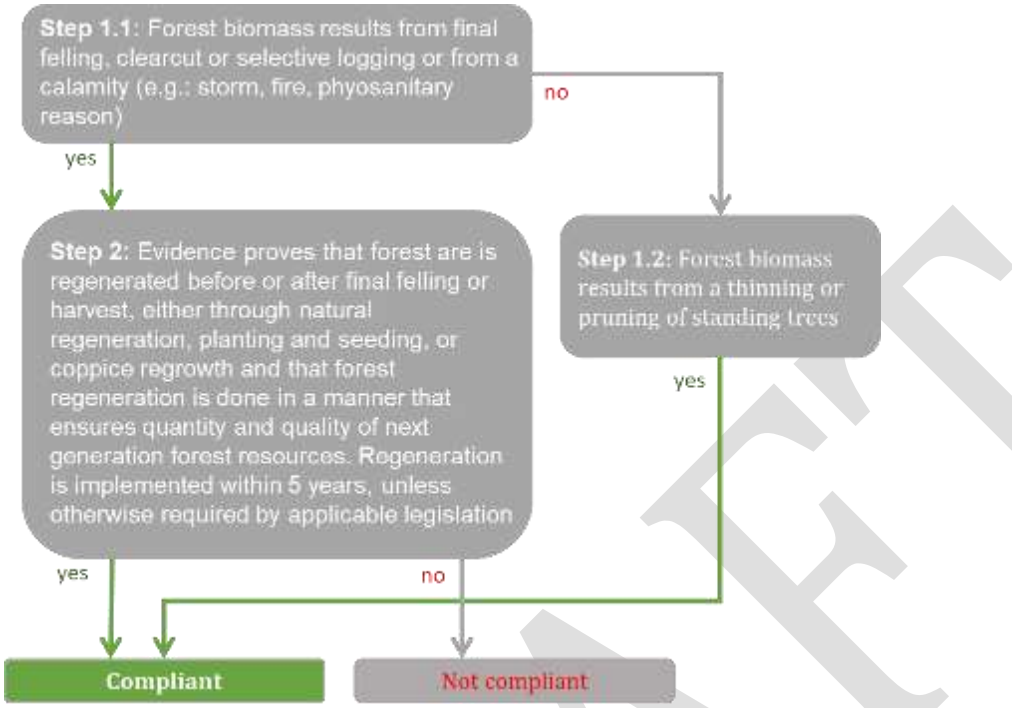


Table B.2. Checklist for demonstrating compliance with the regeneration criterion

Step	Indicator	Sources of information
1.1 and 1.2	Type of forest operation from which biomass results	Forest management plans obtained e.g. from the forest owner directly, or from a competent authority that compiles such information from forests within the sourcing area
2	Quality and quantity of next generation forest resources	Forest management plans obtained e.g. from the forest owner directly, or from a competent authority that compiles such information from forests within the sourcing area

(iii) Protected area criterion

Figure B.4. shows the stepwise approach for demonstrating compliance with **the criterion on protected areas**. Key steps include:

Step 1: Ensure whether areas designated for nature protection, including wetlands and peatlands, are excluded from the forest sourcing area. If no biomass is sourced from such areas, then the criterion on protected areas is de facto complied with. If the sourcing area does however include such areas, then it needs to be ensured that the interventions were permitted and that all conditions and restrictions are followed, as laid out in the following steps.

The information required in Step 1 can be queried e.g. from the IUCN maintains the World Database on Protected Areas (WDPA). This most comprehensive global database on protected areas contains information on location and boundaries of protected areas, legal status and other indicators. Other international networks of designated areas include e.g. the UNESCO Biosphere Reserves, which promotes solutions reconciling the conservation of biodiversity with its sustainable use. There are currently 701 biosphere reserves in 124 countries, including 21 transboundary sites, that belong to the World Network of Biosphere Reserves.

Step 2: Provide evidence that an official permission for biomass harvesting was granted by the relevant competent authority, and clarify the conditions and restrictions that apply to the harvesting from such areas, the species, amounts and locations where these can be logged from. Restrictions could include specification of certain time periods within which the harvesting should or should not be implemented, equipment specifications, protective measures to be implemented with methods for felling and timber extractions, etc.

This information must be provided upon every consignment originating partly or fully from nature protection areas. Otherwise, proof of compliance with relevant legislation is provided through operational reports/harvest protocols describing amounts and harvesting systems in the respective type of nature protection area.

Step 3: Provide evidence of compliance with the relevant conditions and restrictions for harvesting, by means of operational reports that describe measures undertaken in the respective areas, in order to ensure compliance with the condition statements of the relevant competent authority.

Such reports are either implemented by a second or third party and endorsed by the competent authority, or the reports are implemented via field-inspections with an agent of the relevant competent authority. The information must be provided upon every consignment originating partly or fully from nature protection areas.

When all three steps are backed-up with credible evidence, then the biomass is considered compliant with this criterion.

Table B.3 presents the checklist for demonstrating compliance with the criterion **on protected areas**.

Figure B.4. Stepwise approach for compliance with the criterion on protected areas.

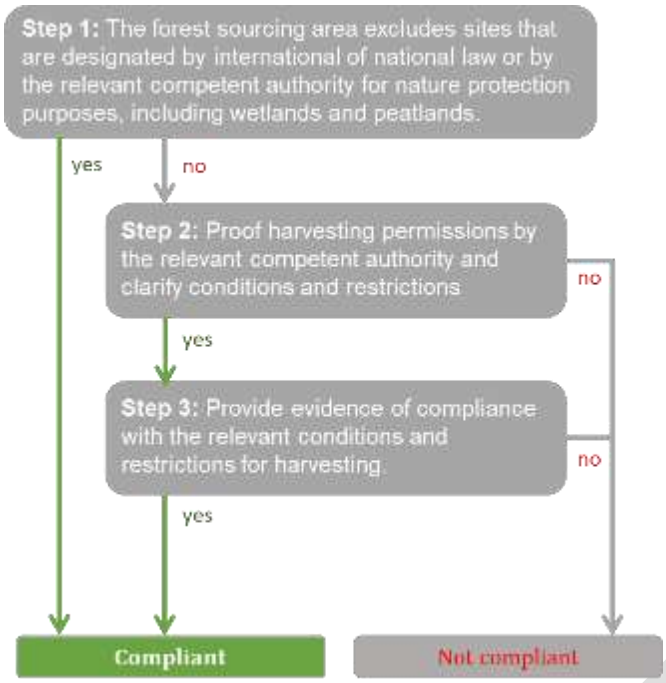


Table B.3. Checklist for demonstrating compliance with the protected areas criterion

Step	Indicator	Sources of information
1	Presence of designated areas for nature protection, including wetlands and peatlands	• IUCN maintains the World Database on Protected Areas (WDPA) • Other international networks of designated areas, e.g. the UNESCO Biosphere Reserves
2	Permission for biomass removal in the protected areas	• Harvesting permission issued by the relevant competent authority • Alternatively, proof of compliance with relevant legislation is provided through operational reports/harvest protocols
3	Implementation of plans/measures in the protected areas	• Operational reports describe compliance measures undertaken in the respective areas, obtained via field-inspections with an agent of the relevant competent authority; or • The confirmations are implemented by second or third party and thereafter endorsed by the competent authority

(iv) Maintenance of soil quality and of biodiversity criterion

Figure B.5 shows the stepwise approach for demonstrating compliance with **the soil and biodiversity criterion**. Steps 1 to 4 concern the part of the criterion that requires minimizing harvesting impacts on soil quality, while step 5 to 8 relate to impacts on biodiversity:

Step 1: Removal of stumps and roots can detrimentally affect soil structure, soil proneness to water and wind erosion, reduce soil fertility and reduce soil carbon. Therefore, in order to protect any soil type, ensure that stumps and roots are excluded from the biomass harvested.

*Step 2.1***:** Identify sensitive areas in the forest sourcing area (prone to compaction, erosion through wind or water, steep slopes etc.). This can be done e.g. on the basis of soil maps, soil sensitivity maps by the operator or supplier or through the provision of detailed field inventory data. Areas must first be identified before forest biomass can be acquired. If no detailed field inventory data for the forest sourcing area is available. The operator has to interpret (digital) available soil maps or on-site analysis with own or third-party expertise with regard to sensitivity including soil type, slope, and soil quality.

Step 2.2: As a general guideline, no biomass extraction is allowed from soil types Rendzina, Lithosol, Ranker, Histosols, Fluvisols, Gleysols and Andosols, unless with explicit permission from the competent authority.

Step 3: When the sourcing area does comprise poor or vulnerable soils, then evidence needs to be provided that logging on such areas is implemented with the correct logging permit and according to specifications mentioned in the permit. Residues cannot be removed unless explicitly permitted in documentation provided by the competent authority.

Otherwise confirmation of compliance with local guidelines or best practice guidelines regarding vulnerable soils through operational reports/harvest protocols is provided (e.g. justification of chosen harvesting system in respect of soil type and slope). If such guidelines do not exist, the operator may require suppliers and forest owners to adopt specific Best Management Practices for certain tasks. These should be specified in supply contracts, or the suppliers and forest owners include a report from qualified experts regarding soil vulnerability and possible harvesting systems endorsed with a statement that harvesting practices were implemented according to required standards. Officially approved forest management plans specify measures to be taken and operational reports confirm implementation of required protocols.

Step 4: Requires for any soil type that measures are planned and implemented to minimize impact on soils (e.g. by means of low or reduced impact logging (RIL), soil protecting harvesting system, low tire pressure, residue topping on logging trails, logging and removal when soil is frozen or under protective snow cover, optimized trail location without redundant driving, permanent logging trails, power shift clutch, skid chains, traction-assisting-winch, exclusion of logging within a certain distance from water bodies, exclusion of logging of forests smaller than a certain size, etc.). In order to minimize impacts of forest management, appropriate assessment of impacts and planning to minimize impacts is necessary. The measures have to be in accordance with the level of vulnerabilities of respective soil types.

At sourcing area level, maintenance of biodiversity according to the harvesting criteria laid down in Article 29.6 requires that, after biomass harvesting, the forest will be re-established with comparable or more biodiversity-favourable characteristics.

Step 5: Assess biodiversity and habitat features so they can be appropriately addressed during planning and implementation of harvesting operations (e.g. habitat features for rare and endangered species, features and prevalent species with a high biodiversity value, including estimated or measured amounts of standing and laying deadwood per hectare, veteran trees, occurrence of rare tree species etc.).

Step 6: Ensure that deadwood is recognized as an important indicator and substrate for many plant and animal species. Recommended or required levels for standing and laying deadwood, including of mature dimensions, need to be left in the forest. The amounts shall either depend on official regulations or on scientifically based recommendations.

Step 7: Verify if during the harvesting operations, the level of deadwood was kept at least at the recommended level, or if the present amounts of deadwood are lower than the recommended level,

then biomass sourcing should incur measures to allow deadwood amounts and dimensions to increase.

Step 8: Verify if preventive and protective measures were taken to protect biodiversity and habitat features, as identified in Step 5, during harvesting operations.

Example: A pre-harvesting inventory or forest management plan (or equivalent) of a logging site which registered the occurrence of endangered tree species. The harvesting plan should then document the practical steps taken during the harvesting intervention to retain the endangered trees in a viable micro habitat. A second example is that standing and laying large dead tree trunks fulfil important ecological functions as substrate e.g. for rare fungi and saproxylic beetles. Harvesting is therefore implemented according to plans that specify minimum amounts of these dead tree trunks to be left in the forest, which is confirmed afterwards as part of a post-harvest inspection.

Protecting biodiversity also means that site-natural forests should not be replaced by agriculturally managed monocultural plantations. This issue is more related to the forest regeneration criterion and referred to that section of this report.

Table B.4 presents the checklist of indicators and sources for demonstrating compliance with **the soil and biodiversity criterion**.

Figure B.5. Stepwise approach for compliance with the maintenance of soil quality and biodiversity criterion.

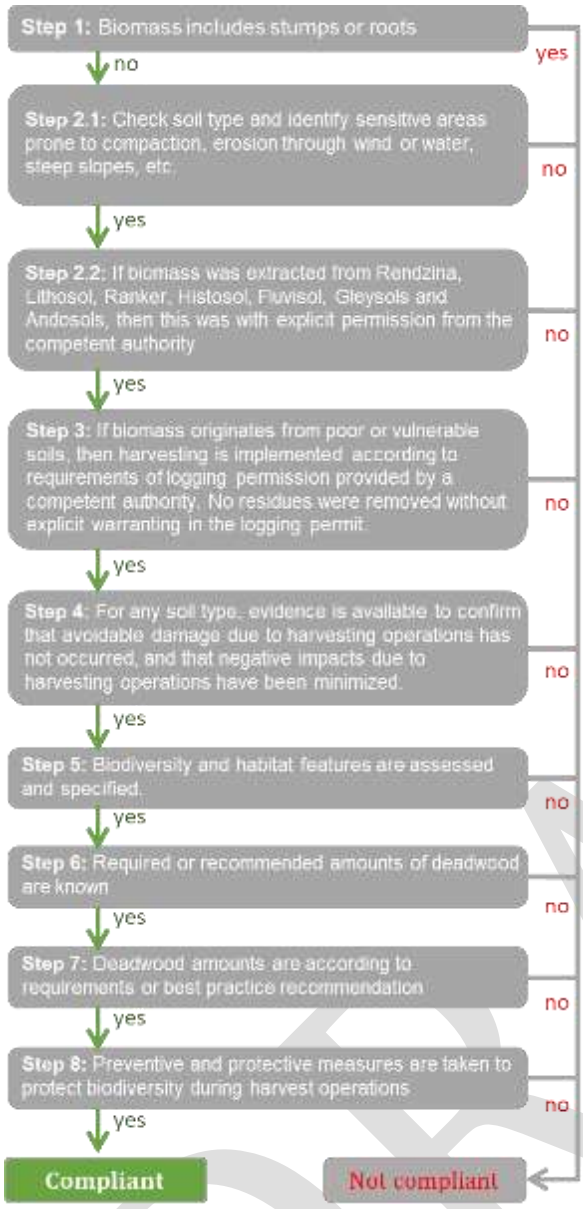

Step 1: Biomass includes stumps or roots
yes
no
Step 2.1: Check soil type and identify sensitive areas prone to compaction, erosion through wind or water, steep slopes, etc.
no
yes
Step 2.2: If biomass was extracted from Rendzina, Lithosol, Ranker, Histosol, Fluvisol, Gleysols and Andosols, then this was with explicit permission from the competent authority
no
yes
Step 3: If biomass originates from poor or vulnerable soils, then harvesting is implemented according to requirements of logging permission provided by a competent authority. No residues were removed without explicit warranting in the logging permit
no
yes
Step 4: For any soil type, evidence is available to confirm that avoidable damage due to harvesting operations has not occurred, and that negative impacts due to harvesting operations have been minimized.
no
yes
Step 5: Biodiversity and habitat features are assessed and specified.
no
yes
Step 6: Required or recommended amounts of deadwood are known
no
yes
Step 7: Deadwood amounts are according to requirements or best practice recommendation
no
yes
Step 8: Preventive and protective measures are taken to protect biodiversity during harvest operations
no
yes
Compliant
Not compliant

Table B.4. Checklist for demonstrating compliance with the soil and biodiversity criterion

Step	Indicator	Sources of information
1	Biomass includes stumps or roots	• Operational post-harvest reports confirm that stumps or roots were not harvested in the sourcing area
2.1; 2.2	Existence of poor or vulnerable soils in the forest sourcing area	• FAO/UNESCO Soil Map of the World • Harmonized World Soil Database – FAO • National or regional soil maps • Identification of poor or vulnerable soils in forest management plans
3	Harvesting on poor or vulnerable soils is implemented according to requirements of logging permissions	• Post-harvest report issued or approved by the competent authority
4	Impacts on soil quality are minimized during and after harvesting	• Forest management plans/operational reports/harvest protocols could include a "checklist" for the assessment of potential impacts as well as an assessment of measures to minimize such at operational level • Operational reports created during or after harvest show proof that precautionary measures have been implemented regarding soil protection and include dated and geo-tagged pictures before -and after- the intervention or written description of impacts on logging trails and damages on the remaining stand • Operational reports/harvest protocols confirm that local best practice guidelines or relevant legislation regarding soil protection during harvesting operations are complied with (i.e. chosen harvesting system is justified in respect of soil type and slope)
5	Biodiversity and habitat features are assessed and specified	• Forest management plans • Operational reports • Pre-harvest inventory • Regional biodiversity assessments
6	Required or recommended amounts of deadwood are known	• Applicable legislation or regulation • Regionally applicable best practices • Scientific recommendations
7	Deadwood amounts are according to requirements or best practice recommendation	• Harvesting protocols • Operational reports • Pre-harvest inventory • Post-harvest assessment
8	Preventive and protective measures are taken to protect biodiversity during harvesting operations	• Harvesting protocols • Operational reports • Post-harvest assessment

(v) Long-term production capacity criterion at sourcing area level
The proposed approach is to retrospectively consider average sustainable harvesting levels in the sourcing area over the five-year period preceding harvesting. When observed in isolation from the requirements to fulfil the first four REDII sustainable harvesting criteria, this approach could be seen as oversimplifying the issue of long-term productivity. However, as all sustainable harvesting criteria need to be fulfilled at all times, the combined requirements are reinforcing one another. While one of the weaknesses of the approach is that climate change impacts are not explicitly considered, the possible need for climate change adaptation measures does need to be taken into account in context of the regeneration criterion and of the LULUCF criterion.

Figure B.6 shows the stepwise approach that economic operators should follow to demonstrate compliance with the criterion **on long-term production capacity** at the forest sourcing area level (level B), following a retrospective approach.

Step 1: Requires that data for 'annually logged wood amounts' and for 'net annual increment' are available for the forest sourcing area in its entirety. Inventory and growth data must cover the entire forest sourcing area and should be based on regional markers, such as growth/drain, harvest level, mortality, and age class distribution, relative to forest types. This requires that a relevant competent party conducts forest inventories periodically, based on in-situ measurements and/or state of the art remote sensing. Detailed harvesting reports need to be compiled periodically for the forest management unit or geographical unit that is as close as possible to the forest sourcing area.

When national or regional forest inventory data are used, it is important to consider data only for forest available for wood supply. Harvested wood amounts from any illegal logging in the forest sourcing area, also needs to be accounted for. The forest inventory information should be considered for an area that is congruent as much as possible with the forest sourcing area.

Step 2: The average annual felled timber amounts is compared to the average net annual increment (e.g. an average measured over a 5-year period preceding the harvesting intervention). When the amount of felled timber does not exceed the net annual increment, current wood extraction is assumed not to impede the long-term production capacity.

Step 3: Evidence and well-argued reasons need to be presented to exceptionally justify if logged amounts would exceed net annual increment. Examples of such justifying reasons include e.g. restructuring of for example exotic intensively managed monocultural single-species even-aged forests into site-natural multi-species uneven-aged woodlands, habitat management or restoration of biodiversity, or that increased extraction took place to counter the effect of biotic or abiotic forest disturbances.

Table B.5 presents the checklist for demonstrating compliance with criterion **on long-term production capacity**.

Figure B.6. Stepwise retrospective approach for compliance with the long-term production capacity criterion

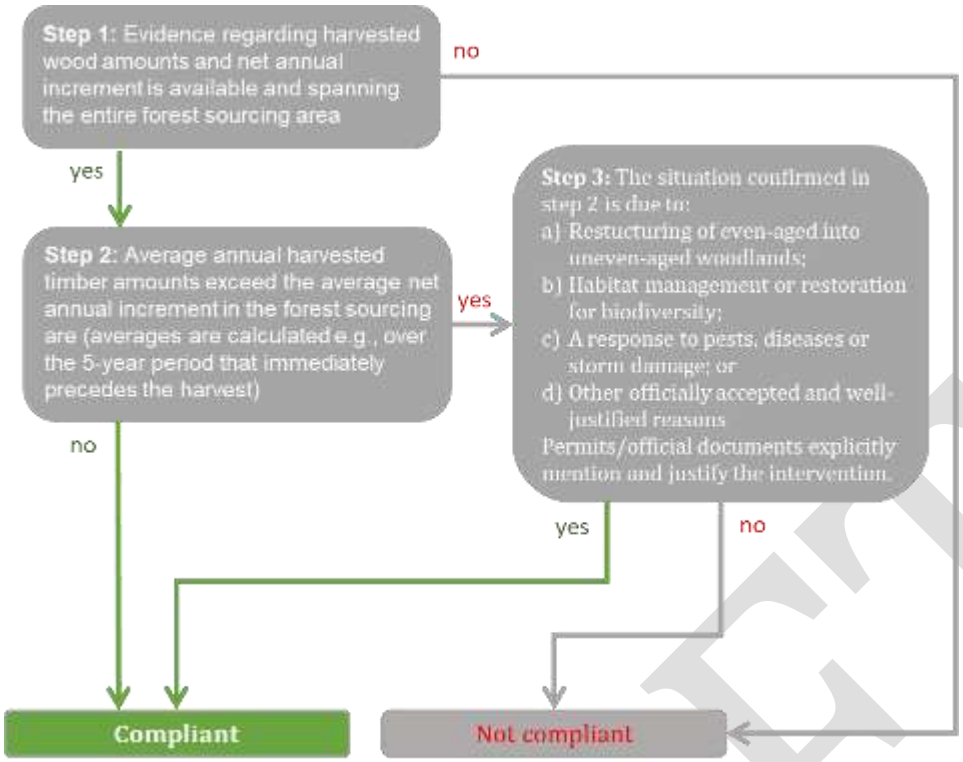


Table B.5. Checklist for demonstrating compliance with the long-term production capacity criterion, following a retrospective approach

Step	Indicator	Sources of information
1; 2	Sustainable harvest levels on forest available for wood supply	• Regional data for net annual increment is published by national or regional forest inventories but can also be calculated on the basis of forest growth models specifically for the forest sourcing are • Regional data for annual harvested timber amounts can be obtained from national or regional forest inventories, or from forest authorities
3	Harvest amounts exceed net annual increments	• Permits or documents including reports of the relevant competent forest authority • Specific permits issued by the relevant competent authority allow these temporally higher harvest levels, for one of the reasons as indicated in Figure B.6 Step 3

B.6 LULUCF criteria at national level

Article 29.7 of the RED II specifies that biofuels, bioliquids and biomass fuels produced from forest biomass taken into account for national renewable energy targets shall meet the following land-use, land-use change and forestry (LULUCF) criteria:

B.6.1 the country or regional economic integration organization of origin of the forest biomass is a Party to the Paris Agreement and:

1) it has submitted a nationally determined contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC), covering emissions and removals from agriculture, forestry and land use which ensures that changes in carbon stock associated with biomass harvest are accounted towards the country's commitment to reduce or limit greenhouse gas emissions as specified in the NDC; or

2) It has national or sub-national laws in place, in accordance with Article 5 of the Paris Agreement, applicable in the area of harvest, to conserve and enhance carbon stocks and sinks, and provides evidence that reported LULUCF-sector emissions do not exceed removals;

B.6.2 where evidence referred to in **B.6.1** is not available, the biofuels, bioliquids and biomass fuels produced from forest biomass shall be taken into account for national renewable energy targets if management systems are in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term.

B.7 Relevant concepts for demonstrating compliance with the LULUCF criteria

This section explains the relevant definitions related to LULUCF in addition to the definitions provided in NTA 8080-1, chapter 3.

B.7.1 LULUCF – Land Use, Land-Use Change and Forestry

A greenhouse gas inventory sector defined by UNFCCC that covers emissions and removals of greenhouse gases resulting from direct human-induced land use, land-use change and forestry activities.

B.7.2 Regional economic integration organization

A regional economic integration organization maintains a process of overcoming barriers that divide neighbouring countries, by common accord, and of jointly managing shared resources and assets. Regional integration essentially is a process by which groups of countries liberalize trade, creating a common market for goods, people, capital and services. For example, the European Union advocates regional integration as an effective means of achieving prosperity, peace and security.

B.7.3 Paris Agreement

The Paris Agreement, inter alia, sets out a long-term goal in line with the objective to keep the global temperature increase well below 2°C above pre-industrial levels and to pursue efforts to keep it to 1,5°C above pre-industrial levels. Forests, agricultural land and wetlands will play a central role in achieving this goal. The Paris Agreement entered into force on 4 November 2016. The Paris Agreement was concluded on behalf of the Union on 5 October 2016 by Council Decision (EU) 2016/1841.38.

B.7.4 Nationally determined contribution (NDC)

Nationally determined contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC) embody planned efforts by each country to reduce national emissions and adapt to the impacts of climate change. Each NDC reflects a country's ambition for reducing emissions, taking into account its domestic circumstances and capabilities. NDCs may include emissions and removals from agriculture, forestry and land use (AFOLU) to ensure that changes in carbon stock associated with biomass harvest are accounted towards the country's commitment to reduce or limit greenhouse gas emissions as specified in the NDC.

NOTE The Paris Agreement (Article 4, paragraph 2) requires each Party to prepare, communicate and maintain successive nationally determined contributions (NDCs) that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions.

B.7.5 Emissions

Anthropogenic (i.e. originating from human activity) emissions of greenhouse gases into the atmosphere by sources.

B.7.6 Removals

Anthropogenic (i.e. originating from human activity) removals of greenhouse gases from the atmosphere by sinks.

B.7.7 Agriculture, Forestry and Other Land Use

This refers to the Land Use, Land-Use Change and Forestry (LULUCF) and Agriculture emission sectors. These are two greenhouse gas inventory sectors defined by the Intergovernmental Panel on Climate Change (IPCC) and are also known as Agriculture, Forestry and Other Land Use (AFOLU).

B.7.8 National or sub-national laws in accordance with Article 5 of the Paris Agreement

One of the criteria, which, when fulfilled, can in part assure national-level compliance with the requirements of REDII Article 29.7(a), stipulates that national or sub-national laws need to be in place, in accordance with Article 5 of the Paris Agreement, applicable in the area of harvest, to conserve and enhance carbon stocks and sinks, and evidence is provided that reported LULUCF-sector emissions do not exceed removals. This implies that comprehensive national or sub-national monitoring frameworks need to be in place to report on carbon emissions and removals by the LULUCF sector.

NOTE This could be checked for example from a country's annual greenhouse gas inventory report submitted to the UNFCCC. Greenhouse gas inventory data can be checked e.g. from https://di.unfccc.int/detailed_data_by_party.

B.7.9 Carbon stock

The mass of carbon stored in a carbon pool.43 Examples of relevant carbon pools are forest biomass (above- and belowground), deadwood, litter and soil organic carbon.

B.7.10 Carbon sink

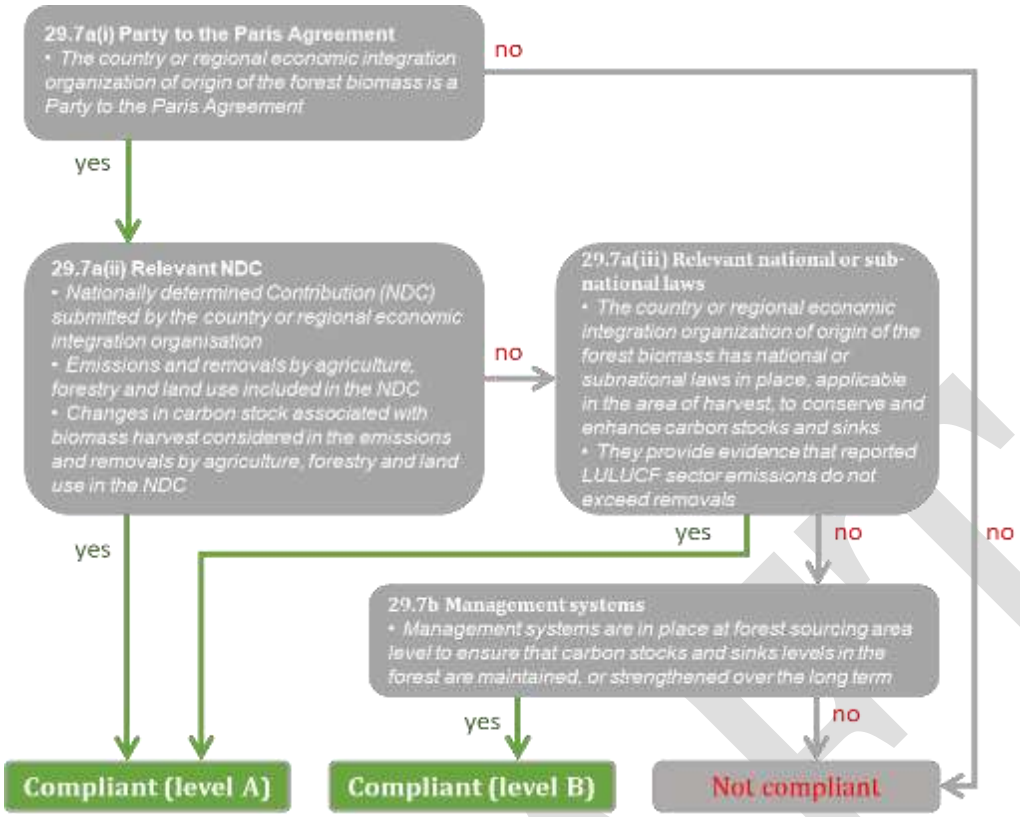
Any process, activity or mechanism that removes a greenhouse gas, an aerosol, or a precursor to a greenhouse gas from the atmosphere.44. Carbon sinks are reservoirs that take-in and store more carbon than they release. Examples of carbon sinks are forests and oceans. 45 Once the carbon is stored, it becomes part of a carbon stock (see carbon stock definition).

B.8 Stepwise approach for demonstrating compliance with the LULUCF criteria

B.8.1 General

Figure B.7 depicts a stepwise approach for economic operators for demonstrating compliance with the LULUCF criteria of RED Article 29.7. It is important to note that when compliance cannot be demonstrated at national or subnational level (referred to as "level A"), evidence shall be sought at forest sourcing area level (referred to as "level B"), as specified in B.8.3.

Figure B.7. Stepwise approach to demonstrate compliance with the LULUCF criteria



B.8.2 Step-wise approach and checklist for demonstrating compliance through national or sub-national laws (level A)

To demonstrate compliance with the LULUCF criteria at national level (as outlined in Section B.6), the economic operators shall demonstrate that the forest biomass is sourced only from countries or regional economic integration organisations that are party of the Paris Agreement and:

— Should have submitted its NDC that covers emissions and removals from agriculture, forestry and land use, ensuring that that changes in carbon stock associated with biomass harvest are accounted towards a country's commitment to reduce or limit greenhouse gas emissions;

or:

— Has laws in place to conserve and enhance carbon stocks and sinks applicable in the area of harvest and that evidence is provided that LULUCF sector emissions do not exceed removals.

In the following, a three-step approach to estimate compliance with the LULUCF sub-criterion at a national level (level A) is described (see also a summary in Table B.6).

Step A.1: Determine if a country or a regional economic integration organisation is a party to the Paris Agreement

As a first step, it is necessary to check whether the country or regional economic integration organisation is listed as a Party to the Paris Agreement. This could be verified from the United Nations list of parties to the Paris Agreement. If this condition is not met, demonstrating compliance at

national level (level A) is not possible and an economic operator should proceed with demonstrating compliance at forest sourcing area level (level B).

Step A.2: Determine if a country or a regional economic integration organisation has submitted a Nationally Determined Contribution (NDC)

In the second step, it is necessary to determine whether the country or regional economic integration organisation from which forest biomass is originating has submitted a Nationally Determined Contribution and whether it has integrated the agriculture, forestry and land use sectors into its NDC (either combined as one AFOLU sector, or as Agriculture and LUCUCF sectors separately).

Please note that countries and regional economic integration organisations are requested to submit the next round of NDCs (new or updated NDCs) by 2020 and every five years thereafter (i.e. by 2020, 2025, 2030), regardless of their respective implementation time frames46. Some countries have already submitted new NDCs and more countries will submit them towards the end of 202047. As NDCs are nationally determined and there are no mandatory accounting methods for LULUCF in the Paris Agreement, but only provisions aimed at ensuring transparency of the method used. Hence, countries will have different approaches to setting national targets in their NDCs and apply different methods to account AFOLU emissions and removals towards their climate targets. Similarly, also the approaches addressing the AFOLU sector in the NDCs may differ; countries might exclude the AFOLU sector from their NDC at all, they might include the AFOLU sector within the overall target for emission reductions, or they might have a separate target for the AFOLU sector (or even separately for agriculture and the LULUCF sectors).

The mere existence of a submitted NDC mentioning the AFOLU sector (or the agriculture and the LULUCF sectors) is not enough for demonstrating compliance with the criteria of Art. 29.7. Instead, the NDC should:

— Explain how the AFOLU sector (or separately for agriculture and the LULUCF sectors) has been considered in the NDC; and
— Count the emissions and removals from the AFOLU sector against the country's overall emission reduction target; and
— Consider carbon stock changes associated with harvesting forest biomass in the total emissions of the AFOLU sector.

In case that all three requirements are met, biomass from any forestry operator in the country/region complies with the LULUCF requirements of REDII. In case the requirements are not met, an economic operator could proceed with the next (third) step.

Step A.3: Determine if national or sub-national laws that aim to conserve and enhance carbon stocks and sinks in forests are in place

For the third step, it is necessary to check whether national or sub-national laws are in place that aim to conserve and enhance carbon stocks and sinks in forests. For example, such laws could be (sub-)national laws implementing the LULUCF Regulation, or other climate change or protection-related laws in case they require that forest carbon stocks and sinks are maintained or enhanced. The presence of a law that merely requires that forest area should be maintained is not sufficient as it does not guarantee that the carbon stocks and sinks are maintained or enhanced.

The presence of such laws must be accompanied with evidence that reported LULUCF sector emissions do not exceed removals. Such information can be obtained from National Greenhouse Gas Inventory Reports submitted to UNFCCC. It is recommended to consider emissions and removals data from a period of the last 10 years, but can be shorter or longer to mitigate the impact of annual disturbance or any eventual stochastic events on the levels of carbon emissions and removals.

Compliance is demonstrated when the sum of reported LULUCF sector emissions (reported as positive values) and removals (reported as negative values) is zero or negative. If this condition is not met, demonstrating compliance at national level (level A) is not possible and an economic operator should proceed with demonstrating compliance at forest sourcing area level (level B).

Table B.6 Summary of LULUCF criteria, related proof of compliance and possible sources of evidence (source: REDIIBIO – Final report)

Criteria	Evidence of compliance	Source
The country or regional economic integration organization of origin of the forest biomass:		
i) is a Party to the Paris Agreement	The country or regional economic integration organization is listed as a Party to the Paris Agreement	United Nations list of parties to the Paris Agreement: https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en
ii) has submitted a nationally determined contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC), covering emissions and removals from agriculture, forestry and land use which ensures that changes in carbon stock associated with biomass harvest are accounted towards the country's commitment to reduce or limit greenhouse gas emissions as specified in the NDC	Presence of a Nationally Determined Contribution in the UNFCCC registry, submitted by the country or regional economic integration organization	NDC is included in the UNFCCC NDC Registry: https://unfccc.int/process-andmeetings/the-parisagreement/nationallydetermined-contributions-ndcs
	Emissions and removals by agriculture, forestry and land use are included in the country's or regional economic integration organization's NDC	Information provided in the NDC
	Changes in carbon stock associated with biomass harvest are considered in the emissions and removals by agriculture, forestry and land use	Information provided in the NDC

iii) has national or sub-national laws in place, in accordance with Article 5 of the Paris Agreement, applicable in the area of harvest, to conserve and enhance carbon stocks and sinks, and providing evidence that reported LULUCF-sector emissions do not exceed removals	Presence of national or subnational laws to conserve and enhance carbon stocks and sinks in forests	National or sub-national legislation
	Reported LULUCF-sector emissions for the country or regional economic integration organization do not exceed removals	Compare emissions and removals for the LULUCF sector, as reported in National Inventory Reports submitted to UNFCCC:https://unfccc.int/process-andmeetings/transparency-andreporting/reporting-and-reviewunder-theconvention/greenhouse-gasinventories-annex-iparties/national-inventorysubmissions-2019

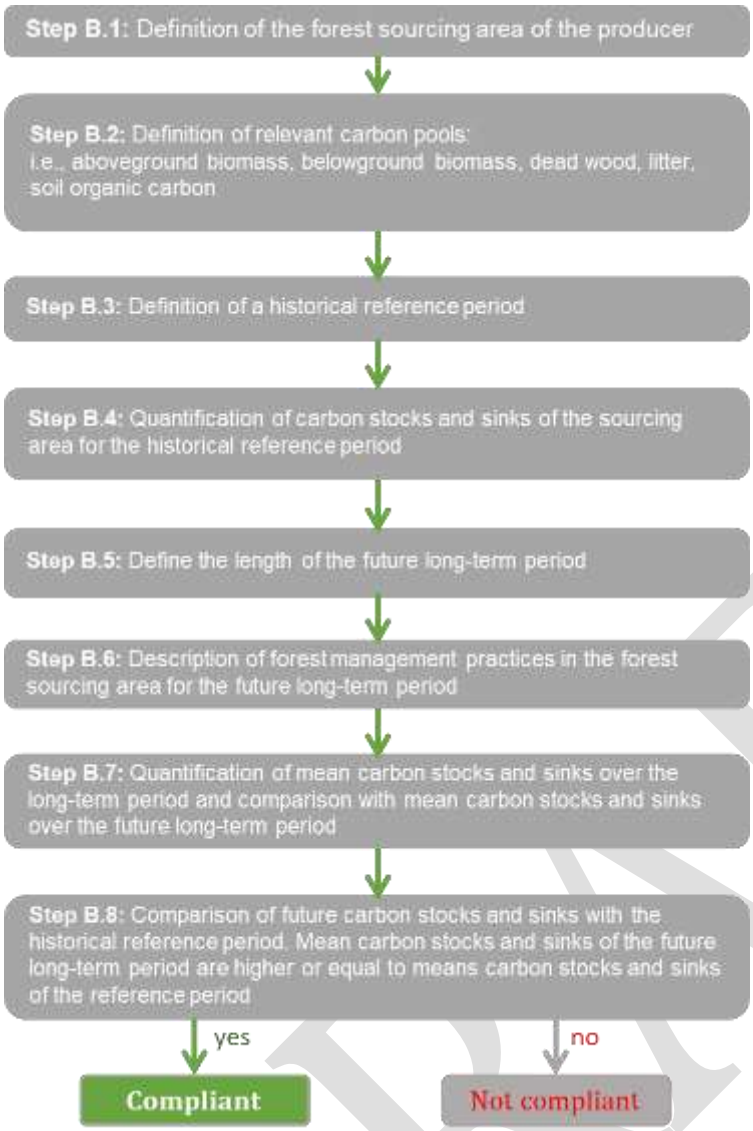
B.8.3 Step-wise approach and checklist for demonstrating compliance through management systems at forest sourcing area level (level B)

If compliance cannot be demonstrated through level A evidence, an economic operator needs to demonstrate at forest sourcing area level that management systems (see NTA 8080-1 for the definition of a sourcing area (3.80) and management system (3.56)) are in place to ensure that carbon stocks and sinks levels in the forest are maintained or strengthened, both over the long term. Such systems should include information from (forward-looking) planning and periodic monitoring of the development of forests and their carbon stocks and sinks.

Methodologies to assess carbon stocks and sinks in forests already exist and could be adapted by an economic operator to provide evidence of compliance with the LULUCF criterion at the level of a sourcing area. Such methodologies are used for national level reporting and assessments to UNFCCC (see IPCC supporting documents) under the LULUCF Regulation (see supporting documents by Grassi et al. (2018)48 and Forsell et al. (2018)) and by voluntary carbon standards for certifying carbon emissions reductions through AFOLU activities at landscape or stand level. These methodologies serve as a useful starting point for developing approaches to demonstrate compliance with the LULUCF sub-criterion, but they need to be adapted as they have not been designed for demonstrating compliance with REDII.

Building on existing methodologies, the following section describes a stepwise approach, including eight steps (see also Figure B.8), to demonstrate compliance with the LULUCF criterion on the level of a forest sourcing area (level B). The approach builds on existing methods for which tools and data can be used that are freely available from public sources. However, it is considered that familiarity with calculations on forest carbon stocks and sinks is needed to be able to provide evidence for compliance. Furthermore, the approach described below requires an economic operator to ensure that a forest management is implemented in the forest sourcing area that will result in equal or higher carbon stocks in the long-term period.

Figure B.8. Steps to demonstrate LULUCF criteria compliance at forest sourcing area level



Step B.1: Define the spatial boundaries of the compliance check

The sourcing area of an economic operator comprises the area for which compliance needs to be demonstrated (see B.3.4 for the definition of a sourcing area). To satisfy the requirements as set out in REDII Article 2.30, it is recommended that the compliance check is conducted for a geographically explicit area belonging to a single country or a region, depending on which level forest legislation is regulated. Furthermore, it is recommended to conduct the compliance check for a geographically explicit area having common forest management practices that ensure implementation of sustainable yield management in the sourcing area during the assessment period (please see step B.6 for a definition of the temporal boundaries). Please note that spatial boundaries are not necessarily relating to a continuous, unfragmented patch of land, but may comprise several mutually unconnected areas.

Step B.2: Define relevant carbon pools

REDII requires maintaining or increasing of carbon stocks and sink levels at the sourcing area level, without specifying which carbon pools to consider. Carbon stocks and sinks in forests include multiple pools. It is good practice to consider all the carbon pools in forests, as specified by UNFCCC which include:

1) Aboveground biomass

2) Belowground biomass
3) Litter
4) Dead wood
5) Soil (mineral and organic soils)

These pools also encompass the carbon pools considered relevant by the LULUCF Regulation except the Harvested Wood Products pool. The Harvested Wood Products pool can be excluded because it is not a **forest** carbon pool.

Step B.3: Determine a historical reference period

REDII does not specify a historical year or period that can serve as a reference to compare the future development of carbon stocks and sinks in the sourcing area. It is recommended that an economic operator uses the average carbon stocks and sinks over a reference period that will serve as a benchmark against which maintenance or strengthening of carbon stocks and sinks of a sourcing area will be compared.

It is recommended that a fixed period in time is used to avoid the effects of biomass harvest progressively lowering carbon stocks and sinks. In line with the reference period used in the LULUCF Regulation, it is proposed to focus on the period 2000-2009, but it can be shorter or longer to facilitate the use of forest inventory data or to mitigate the impact of annual disturbance or any eventual stochastic events on the levels of carbon stocks and sinks in the sourcing area. In any case, the selected reference period should reflect representative carbon stocks and sinks in the supply area (i.e. is consistent with any broader historical data used as evidence). The economic operators are encouraged to provide argumentation for the definition of their reference period. An economic operator should avoid using short periods (or a single year) as reference period in which significant natural disturbance took place as they may strongly disrupt forest carbon stocks and especially sinks.

Step B.4: Quantify carbon stocks and sinks of the sourcing area for the historical reference period

The requirement "*to maintain or strengthen*" carbon stocks and sinks (REDII, 29.7(b)) requires the existence of a historical reference value that can be used to estimate if a specific carbon stock and sink value has been maintained or increased. Hence, data need to be collected to estimate mean values for carbon sinks and stocks of the sourcing area during a reference period as reference values for a compliance check.

Data on carbon stocks and sinks in the sourcing area may be obtained from (repeated) forest inventories or forest management plans, provided they are transparent, accurate and reliable. If there are no existing data on carbon stocks and sinks in the sourcing area, an economic operator can estimate mean carbon stocks and sinks of the sourcing area for the historical reference period, for example by applying forest carbon calculators or models (see Table B.7). Data (tree species, growing stock, age-structure, increment rate, see Table B.9) to be used in these tools can be obtained from historical forest management plans or inventories conducted in the sourcing area, but additional data (e.g. basic wood density, carbon content, factors to estimate whole-tree biomass) may be needed to provide necessary information on all of the relevant carbon pools (see step B.2).

It is recommended that an economic operator provides or estimates reference values for all the relevant carbon pools individually. When estimating historical carbon stocks and sinks, it is recommended to further stratify the sourcing area in homogenous units. Stratification is not an explicit requirement by REDII but is suggested to improve accuracy of the estimates. When stratifying the sourcing area, an economic operator can consider some of the following factors:

— Administrative/legal conditions:

- Administrative region where sourcing level is located (e.g. region, province, municipality);
- Ownership type (e.g., private, public);

— Biophysical conditions:
- Topography;
- Site conditions (e.g. forest site index);

— Forest characteristics:
- Tree species composition;
- Forest management regime.

In case an economic operator is not able to quantify one of the above-mentioned pools (e.g. litter or soil carbon, see step B.2), it is recommended that a justification is provided why a pool cannot be quantified (e.g. absence of data on the litter or soil carbon pools) and why omitting the pool does not affect compliance with the requirement to maintain or strengthen carbon stocks in the long term.

Step B.5: Define the length of the future long-term period

REDII requires that the levels of carbon stocks and sinks of a sourcing area are maintained or strengthened, both over the long term. However, the Directive does not specify the period of time that needs to be considered. It is recommended to conduct a compliance check for a period of at least 30 years. Please note that the assessment period is not static and always forward looking. Accordingly, it is recommended that the assessment period covers at least 30 years after a harvesting event from which biomass is sourced.

Step B.6: Describe forest management practices in a sourcing area for the future long-term period

To prove that carbon stocks and sinks of a sourcing area are strengthened or maintained over a longterm period (recommended 30 years, see step B.5), an economic operator should describe forest management practices that are reasonably expected to be practiced in the long term.

Information on future forest management may be derived from existing forest management plans or other verifiable evidence. The future forest management practices must at minimum comply with legal requirements that are valid in a sourcing area.

When describing the future forest management practices in the sourcing area, the following factors could be considered that may affect the development and calculation of forest carbon balances and sinks in subsequent steps:

— Annual harvest level;
— Tree species composition;
— Forest reproductive material used (provenance);
— Thinning intensity and frequency;
— Cutting regime (e.g. even-aged clearcutting, shelterwood, group or tree selection, coppice);
— Other management decisions (e.g. fertilization, drainage, herbicide and pesticide application, etc.);
— Average minimum and maximum rotation length.

Potential data sources for these factors are listed in Table B.8.

Step B.7: Quantify mean carbon stocks and sinks over the future long-term period

To assess how carbon stocks and sinks will develop over the long term, it is recommended that economic operators develop a projection of the development of carbon stocks and sinks in the forest

sourcing area, based on forest growth and planned management practices. Assumptions on the effects of future impact of policies and markets should be avoided as much as possible. Economic operators can apply forest carbon calculators and models (for an overview of potential tools, see Table B.7) as a basis for these calculations. Such tools will require information on future forest management practices (see Step B.6), forest structure (e.g., tree species, growing stock, age structure) and growth (increment), as well as additional data (e.g. basic wood density, carbon content, factors to estimate whole-tree biomass) (for an overview of potential data sources, see Table 9). In line with the recommendations provided in step B.4, it is recommended to stratify the sourcing area in homogenous units to improve accuracy of the estimates.

To ensure comparability of the estimates, it is recommended that the same carbon pools (see step B.2), data and methods are employed as for estimating carbon stocks and sinks in the reference period. The future and historically oriented estimates should be methodologically and quantitatively comparable.

In a case when an economic operator is not able to quantify any of the abovementioned pools (e.g. litter or soil carbon, see step B.2), it is recommended that a justification is provided why a pool cannot be quantified (e.g. absence of data on the litter or soil carbon pools). Also, it is recommended to consider relevant secondary data and information to explain how forest biomass removals are expected to affect these carbon pools in the long term at the forest sourcing area.

Finally, it is recommended to document the temporal development of all carbon pools to facilitate the comparison with results obtained from monitoring, as a basis for the verification of compliance under REDII Article 30.

Step B.8: Compare future carbon stocks and sinks with the historical reference period

The compliance with the LULUCF criterion may be proven by comparing both the mean carbon sinks and stocks for the long-term period (step B.7) with the carbon stocks and sinks of the reference period (step B.4). If mean carbon stocks and sinks of a long-term period are higher or equal to mean carbon stocks and sinks of a reference period, an economic operator is compliant with the LULUCF criteria.

Several issues must be noted regarding the above described stepwise approach for demonstrating compliance at the sourcing area level. These relate inter alia to the need for monitoring of the actual development of forest carbon stocks and sinks to support the verification of compliance with the sustainability and greenhouse gas emissions saving criteria, under REDII Article 30. These challenges are described in B.8.4.

Table B.7 Checklist of possible tools to demonstrate LULUCF criteria compliance at forest sourcing area level (source: REDIIBIO – Final report)

Name of tool	Brief description	URL
CO2FIX	Stand level simulation model, which quantifies the C stocks and fluxes in the aboveground biomass, belowground forest biomass, soil organic matter and the wood products chain	http://dataservices.efi.int/casfor/models.htm

CBM-CFS3	Stand- and landscape-level modelling framework that simulates the dynamics of all forest carbon stocks required under the Kyoto Protocol (aboveground biomass, belowground biomass, litter, dead wood and soil organic carbon)	https://www.nrcan.gc.ca/climate-change/impactsadaptations/climatechange-impactsforests/carbonaccounting/carbonbudget-model/13107
YASSO soil carbon model	Dynamic model of the cycling of organic carbon in soil. Yasso calculates the amount of soil organic carbon, changes in the amount of soil organic carbon and heterotrophic soil respiration	https://en.ilmatieteenlaitos.fi/yasso
CASMOFOR	Tool to assess the amount of carbon sequestered in a forest system (aboveground biomass, belowground biomass, litter, dead wood and soil organic carbon)	http://www.scientia.hu/casmofor/index.php
FORMIND	Individual tree-based vegetation model that simulates the growth of forests on the hectare scale. It allows to explore forest dynamics and forest structure	http://formind.org/model/

Table B.8 Potential data sources to demonstrate LULUCF criteria compliance at forest sourcing area level (source: REDIIBIO – Final report)

Variable affecting carbon stock and sinks in forests	**Potential source of information**
Tree species composition	Forest inventories Forest management plan
Age structure	Forest inventories Forest management plan
Forest reproductive material used (provenance)	Forest management plan
Growth rate of the selected tree species and forest reproductive material used	Forest inventories National or regional yield tables Producer of seedlings or seeds used for regeneration

Basic wood density	IPCC 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol
Carbon content	IPCC 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol
Whole-tree biomass in relation growing stock volume	IPCC 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol National GHG inventory report to UNFCCC FAO method collection, see http://www.fao.org/3/w4095e/w4095e06.htm . Scientific literature
Thinning intensity and frequency	Forest management plan Forest management recommendations applicable to the forest sourcing level
Rotation length	Forest management plan Forest management recommendations Empirical historic data for the sourcing area on rotation cycles applied
Cutting regime	Forest management plan Forest management recommendations
Other management decisions	Forest management plan Forest management recommendations

B.8.4 Challenges related to demonstrating compliance at the sourcing area level

There are several distinct challenges that must be pointed out with respect to the above described compliance assessment approach. The challenges are related to how to respond to **uncertainties, non-permanence, and time dynamics**.

It is essential that the above-described approach is supported by monitoring activities that would verify estimates of future carbon stocks and sinks as estimated by carbon models. This is because actual forest developments might differ from the modelled development, for example as a result of changes in forest management objectives and practices or natural disturbances. A monitoring and verification system actual development of carbon stocks and sinks should be used to support documentation of compliance.

Deviations between the projected and actual development of stocks and sinks due to natural disturbances would require adaptive responses by the management of the forest. Management plans need to consider such circumstances and be flexible enough to respond and assessments of likely disturbances need to be an integral part of the plan. Emissions caused by natural disturbances are to be excluded from the accounts of an economic operator, only if a disturbance event represents a statistical outlier in a natural disturbance regime of a supply area. To prove that a disturbance

represents a statistical outlier, an economic operator can adapt the methodology described in Article 10 and Annex VI of Directive EU 2018/841.

Some tree species may be negatively affected by climate change through changes in productivity or through natural disturbances, which could negatively affect the development of their carbon stocks and sinks levels over the long term. REDII does not specify how climate change impacts should be considered. A change of tree species (or provenance), or another change in the management of the future stand to anticipate or adapt to new conditions, may result in a (temporary) decrease in carbon stocks and sinks in the short term with the aim to maintain or strengthen carbon stocks and sinks in the long term. It may be necessary to allow for a temporary reduction of carbon stock and sinks if this will result in maintaining or strengthening carbon stocks and sinks in the long term. At the forest sourcing area level, carbon stocks and sinks levels in the forest are considered to be maintained, or strengthened over the long term if forest management will be continued or improved on the basis of regionally adopted specific site-suitable practices under current and future conditions.

B.8.5 Template Risk assessment – Level A

1. Authors' profile
Information about the author's work experience, training / education and other relevant qualifications to demonstrate the author's ability to properly performed the risk assessment. Author’s roles in the risk assessment should also be indicated
2. Scope of the assessment and summary (national/subnational level)
This section contains essential information about the analysis
3. Date of the risk assessment
This section contains dates of: preparation of the draft, public consultation, final approval, validity
4. Identification of the sourcing area
This section contains description of sourcing area i.e. geographical location, size, topography and other essential information.
5. Forestry industry description
This section should contain the description of the structure of forestry (and the wood industry relevant to scope of the risk assessment
6. Evaluation of the level of risk for each criterion
This is the core part of the risk assessment. Criteria should be scrutinised carefully, and the findings shall be well documented
6.1. The legality of harvesting operations
Legislation and enforcement and monitoring of the legislation shall be fully described
6.2. Forest regeneration of harvested areas
Legislation and enforcement and monitoring of the legislation shall be fully described
6.3. Biodiversity
Legislation and enforcement and monitoring of the legislation shall be fully described
6.4. Soil quality management
Legislation and enforcement and monitoring of the legislation shall be fully described

6.5. Areas designated by international or national law for nature protection purposes
Legislation and enforcement and monitoring of the legislation shall be fully described
6.6. Maintenance of long-term production capacity of forests
Legislation and enforcement and monitoring of the legislation shall be fully described
6.7. Guarantee of carbon sequestration parity
Legislation and enforcement and monitoring of the legislation shall be fully described

Summary

No.	Criterion	Findings	Compliant (Y/N)	Remarks
1	The legality of harvesting operations			
2	Forest regeneration of harvested area			
3	Biodiversity			
4	Soil quality management			
5	Areas designated by international or national law for nature protection purposes			
6	Maintenance of long-term production capacity of forests			
7	Guarantee of carbon sequestration parity			

B.8.6 Template Risk assessment – Level B

1. Authors' profile
Information about the authors and their roles in the risk assessment
2. Scope of the assessment and summary (national/subnational level)
This section contains essential information about the analysis
3. Date of the risk assessment
[This section contains dates of issuing and validity of the assessment
4. Identification of the sourcing area
This section contains description of sourcing area i.e. geographical location, size, topography and other essential information...
5. Forestry industry description
This section should contain the description of the structure of forestry
6. Evaluation of the level of risk for each criterion

6.1. The legality of harvesting operations
The organisation needs to provide evidence that criteria are met according to the pathway specified in Figure B.2
6.2. Forest regeneration of harvested areas
The organisation needs to provide evidence that criteria are met according to the pathway specified in Figure B.3
6.3. Areas designated by international or national law for nature protection purposes
The organisation needs to provide evidence that criteria are met according to the pathway specified in Figure B.4
6.4. Soil quality management and Biodiversity
The organisation needs to provide evidence that criteria are met according to the pathway specified in Figure B.5
6.5. Maintenance of long-term production capacity of forests
The organisation needs to provide evidence that criteria are met according to the pathway specified in figure B.6
6.6. Guarantee of carbon sequestration parity
The organisation needs to provide evidence that criteria are met according to the pathway specified in figure B.7

Summary

No.	Criterion	Findings	Compliant (Y/N)	Remarks
1	The legality of harvesting operations			
2	Forest regeneration of harvested area			
3	Biodiversity			
4	Soil quality management			
5	Areas designated by international or national law for nature protection purposes			
6	Maintenance of long-term production capacity of forests			
7	Guarantee of carbon sequestration parity			

Results

It shall be explicitly stated whether or not Level B is met.

Annex C
(normative)

Low ILUC risk

C.1 General

An organization can decide to qualify its biobased raw material as low ILUC risk if the agricultural biomass meet the requirements to be qualified as such. The low ILUC risk is based on additionality measure(s) that require independent verification. Only additional agricultural biomass produced from the date of a positive independent verification (i.e. certification) may be claimed as low ILUC risk and be sold as such.

NOTE The information to be submitted to the certification body to apply for low ILUC risk certification is described in NCS 8080-1:2024, 7.2.2. Where in this document reference is made to low ILUC risk claims also low ILUC risk certification can be read as certification is required to make low ILUC risk claims.

C.2 Management plan

C.2.1 The organization shall develop a management plan that includes ate the least the following information:

a) a definition of the delineated plot of land;

b) a description of additionality measure(s) including identified sustainability risks stemming from the implementation of the additionality measure(s);

c) check on sustainability of the additionality measure against the requirements of Directive (EU) 2018/2001;

NOTE The relevant requirements of Directive (EU) 2018/2001 relate to NTA 8080-2:2024, C.3.

d) where relevant, demonstration of additionality assessment (either financial attractiveness or non-financial barrier analysis);

e) determination of the dynamic yield baseline, including:

1) for yield increase measures: at least three years of historical crop yield data;

2) for cultivation on unused, abandoned or severely degraded land:

— proof of land status;

— the baseline yield for cultivation on unused, abandoned or severely degraded land is considered to be zero.

f) estimate of the additional agricultural biomass yield per year, with reference to the dynamic yield baseline for the delineated plot.

C.2.2 The management plan shall allow a comparison to be made between the use of the delineated plot before and after implementation of the additionality measure(s).

C.3 Additionality measures

C.3.1 Additionality measures are measures that go beyond common agricultural practices. Measures, or combinations of measures, shall boost output without compromising sustainability. The additionality measure shall not compromise future growing potential by creating a trade-off between short-term output gains and mid/long-term deterioration of soil, water and air quality and pollinator populations. The additionality measures shall not result in homogenization of the agricultural landscape through removal of landscape elements and habitats, such as solitary trees, hedgerows, shrubs, field edges or flower strips. Table C.1 provides an non-exhaustive list of additionality measures that the organization can take to claim for low ILUC risk.

Table C.1 — List of additionality measures (non-exhaustive)

Additionality category	**Additionality measure**	**Example**
Replanting (for perennial crops) [a]	Choice of crop varieties	Higher yield variety, better adaptation to eco-physiological or climatic conditions
Mechanization	Machinery	Adoption of machinery that reduces/complements existing workforce input to boost output or reduce losses, including sowing, precision farming, harvesting machinery or machinery to reduce post-harvest losses
Multi-cropping	Sequential cropping	Introduction of second crop on same land in the same year
Management	Soil management	Mulching instead of ploughing, low tillage
	Fertilization	Optimization of fertilization regime, use of precision agriculture
	Crop protection	Change in weed, pest and disease control
	Pollination	Improved pollination practices
	Other	Leaves room for innovation, combinations of measures and unforeseen developments

[a] Replanting at the end of the crop lifetime is always necessary for a perennial crop. For replanting to count as an additionality measure, the organization shall prove that their replanting goes beyond 'business as usual'.

C.3.2 Only additional yield above the dynamic yield baseline may be claimed as low ILUC risk. An additionality measure may only be qualified as low ILUC risk, if this measure aims to achieve additional yields as a result of an improvement in agricultural practice. If a measure is applied that only aims to improve the sustainability of the plot, without improving yields, it is not deemed an additionality measure. This is not the case with cultivation on abandoned or severely degraded land, in which case the cultivation itself is the additionality measure.

C.3.3 The organization shall demonstrate that the management plan (see C.2) sets reasonable expectations on the yield increase by referring to scientific literature, experience from field trials, information from agronomy companies, seed/fertilizer developers or simple calculations.

NOTE Satisfactory evidence supporting the expected yield increase of the additionality measure applied is needed for the project to be low ILUC risk certified.

C.3.4 In the case of agricultural improvements, the organization shall document in detail in its management plan (see C.2) the agricultural practices applied, machinery and means before and after the additionality measure has been applied. This documentation shall allow a comparison in order to:

— determine whether an additionality measure has been implemented;

— evaluate if that additionality measure may be considered to be additional compared to a 'business as usual' development.

A similar level of proof shall be provided for additionality measures that enable unused land to be brought back into use.

C.4 Financial attractiveness and barrier analysis tests

C.4.1 Financial attractiveness test

C.4.1.1 The financial attractiveness analysis shall demonstrate that the investment required for the additionality measure becomes financially attractive only if the resulting additional yield can be claimed as low ILUC risk. The analysis shall consist of a simple financial analysis of the envisaged low ILUC additionality measure investment. The analysis shall include only those costs and yields that are directly related to the additionality measure investment. Normal operating costs of the entire organization shall not be included in the analysis. The costs and revenues included in the analysis shall be related to the preparation, implementation, maintenance and decommissioning of the additionality measure that would not have been otherwise incurred.

C.4.1.2 Financial attractiveness arises from a business case in which the net present value, NPV, of the investment is positive, which means that the investment can be conducted by the organization itself. As a result, only measures for which the business case analysis is negative (i.e. without the inclusion of a premium) shall pass the financial additionality test and become eligible to be claimed as low ILUC risk. A positive NPV may still be eligible only if they pass the non-financial barrier analysis in accordance with C.4.2.

NOTE The NPV is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. NPV is used in capital budgeting and investment planning to analyse the profitability of a future investment or project.

C.4.1.3 The NPV of an investment shall be calculated in accordance with Formula (C.1):

$$NPV = \sum_{t=1}^{n} \frac{R_t}{(1+i)^t} \qquad \text{(C.1)}$$

where

R_t is the net cash inflow-outflow during a single period t;

i is the discount rate or return that can be earned in alternative investments;

t is the number of timer periods.

C.4.1.4 The parameters used in the financial attractiveness calculation shall be in line with the data included in the management plan (see C.2). The following parameters shall be included in the NPV calculation in accordance with Formula (C.1):

a) estimate of additional volume of agricultural biomass;

b) raw material sales price [currency/tonne]:

1) the raw material sales price may be a single number extrapolated over the lifetime of the additional yield investment;

1) this single number may be based on an average of actual historical raw material sales values achieved by the organization, for which the average value shall be based on data for the same three years that the historical yield data used to set the dynamic yield baseline;

2) in the case of the introduction of a new crop for which the organization does not have actual price data, this value may be based on price data from the FAO producer prices statistics **Fout! V erwijzingsbron niet gevonden.**;

c) discount rate to be used: 3,5 % for high-income countries and 5,5 % for all other countries;

d) lifetime of the investment:

1) a lifetime of 10 years shall be used in conformity with the lifetime of the low ILUC risk claim (baseline validity);

2) in some cases, the maximum lifetime of the investment may be set at 25 years based on the typical lifetime of perennial crops (e.g. oil palm tree in the case of oil palm replanting);

e) investment cost related to the additionality measure, both capital expenditures (CAPEX) and operational expenditures (OPEX).

C.4.2 Non-financial barrier analysis test

C.4.2.1 The non-financial barrier analysis shall only cover non-financial project barriers that prevent the implementation of the additionality measures in case of no low ILUC risk claims. Any barrier whose cost can be estimated shall be included in the financial attractiveness analysis (see C.4.1) rather than in the non-financial barrier analysis. The non-financial barrier test shall be used only in very exceptional cases.

C.4.2.2 The organization that plans the additionality measure is responsible for justifying the existence of non-financial barriers. This justification shall consist of a clear, verifiable description of the situation that prevents the uptake of the additionality measure. The organization shall provide all the necessary verifiable evidence to support the claim and demonstrate how the low ILUC risk claim will ensure that the non-financial barrier is overcome.

C.5 Production on unused, abandoned or severely degraded land

C.5.1 If additionality measure(s) are related to production on unused, abandoned or severely degraded land, the organization shall provide evidence that for a consecutive period of at least five years before the start of cultivation of the agricultural biomass used for the production of biofuels, bioliquids or biomass fuels, the delineated areas were neither used for the cultivation of food and feed crops or other energy crops nor used for the cultivation of any substantial amount of fodder for grazing animals.

C.5.2 For land to be qualified as abandoned land, the organization shall provide additional evidence that food or feed crops were once grown on the delineated area before the consecutive period of at least five years. That evidence shall also prove that the production ceased for biophysical reasons (see C.5.3) or socioeconomic reasons (see C.5.4).

C.5.3 Biophysical changes which adversely affect the growing of food and feed crops include, but are not limited to, the following events:

a) an increased frequency of severe weather events, such as droughts, storms or floods;

b) changes in seasonal temperature patterns which affect plant phenology;

c) increased pests and diseases;

d) damage to irrigation systems;

e) damage to soil, such as severe salination, depletion of organic matter and erosion rendering them 'severely degraded'.

C.5.4 Socioeconomic factors adversely affecting the economic viability of production, leading to the abandonment of the land include, but are not limited to, the following events:

a) changes in market prices (e.g. increased input or labour costs, or both, or reductions in the price fetched by finished crops);

b) labour becoming unavailable (e.g. as a result of migration);

c) failure of the supply chain (e.g. through the closure of a local market or a transport link);

d) disputes about ownership (e.g. in the context of inheritance);

e) political instability (e.g. confiscation or nationalization of the land).

C.5.5 The organization that wishes to claim agricultural biomass produced on severely degraded land as low ILUC risk, shall provide the following soil test results, as applicable:

— in the case of salinisation, the results of testing by a qualified agronomist of the electroconductivity of the soil using the saturated paste method;

— in the case of low soil organic matter, results from an appropriate number of samples of soil from the delineated plot, determined by a qualified agronomist, using the dry combustion method;

— in the case of severe erosion, at least 25 % of the delineated plot shall have been eroded as determined by a qualified agronomist, supported by photographs.

C.5.6 Delineated areas that qualify as unused land shall pass an additionality test in accordance with C.4 in order to be eligible for making low ILUC risk claims. Delineated areas that qualify as abandoned or severely degraded land shall not be required to pass the additionality test in order to be eligible for low ILUC risk claims.

C.5.7 In the case of production on unused, abandoned or degraded land, the dynamic yield baseline shall be set to zero with no trend line.

C.6 Setting dynamic yield baseline

C.6.1 General

The dynamic yield baseline shall be set individually for each delineated plot based on the crop and the type or combination of additionality measures applied. Plot-specific historical crop yield data from the

three years preceding the application of an additionality measure shall be used to calculate the starting point of the dynamic yield baseline. This shall be combined with a global crop-specific trend line for expected yields based on historical data of actual yields over the past decade, or longer if data is available. For perennial crops, the dynamic yield baseline shall take into account the yield curve over the lifetime of the crop.

C.6.2 Setting dynamic yield baseline for annual crops

C.6.2.1 In the case the organization rotates crops between fields and the target crop has been planted in different fields on the same production location in previous years, the organization shall use one of the following two options to gather the historical yield data in order to calculate the dynamic yield baseline:

1) The organization calculates an average of the yields for the three most recent years that the target crop was grown on the specific delineated plot prior to implementation of the additionality measure. As crops are grown in rotation, this may mean using data that is more than five years old.

2) The organization calculates a weighted average of the yields of the three most recent years that the target crop was grown on the production location prior to implementation of the additionality measure, even if those yields were obtained from different plots of different sizes on the same production location.

C.6.2.2 If historical data for the three most recent years of crop yields is not available, whether inaccessible or not representative, additional data may be obtained for previous years or data from a neighbouring production location growing the same crop under the same management plan. If one of the three years of historical data represents an exceptionally good or bad harvest (e.g. discrepancy of 30 % or more compared to the other reference years), the outlier crop yield shall not be included in the calculation to avoid skewing the three-year average.

NOTE In line with Article 2(7) of Delegated Regulation (EU) 2019/807, yield fluctuations are to be excluded.

C.6.2.3 The organization shall consider the crop yield data quality. This is the case, if a plot size varies too much for the three years upon which the average is based (e.g. if the smallest plot size is less than 10 % of the largest plot size in the years selected).

C.6.2.4 The slope of the dynamic yield baseline shall be taken as the slope of a straight trend line fitted for yield developments of the target crop over the previous ten years based on global data. These data shall be derived from the FAO World+ data statistics for the relevant crop [1]. This shall be done at the start of the period for which the low ILUC risk claim will be made. The slope shall be valid for the 10-year baseline validity period.

C.6.2.5 Table C.2 shows the slope of the dynamic yield baseline for the most common biofuel raw material crops. The values in Table C.2 are obtained by fitting a trend line over 20 years of global crop data obtained from the FAO World+ data statistics for the crop concerned.

[1] FAOSTAT producer prices. Source: http://www.fao.org/faostat/en/#data/PP

Table C.2 — Slope of dynamic yield baseline for most common biofuel raw material crops

Crop	Barley	Maize	Oil palm fruit	Rape-seed	Soybean	Sugar beet	Sugar cane	Sun-flower seed	Wheat
$Slope_{20}$ [a]	0,035	0,074	0,200	0,036	0,028	1,276	0,379	0,035	0,040
[a] $Slope_{20}$ is based on the period 2008 to 2017 and presents the average improvement in yield expressed in tonne/ha/year.									

For any crop in Table C.2, the dynamic yield baseline is determined by taking the starting point (i.e. 3-year average of historical yields prior to application of the additionality measure) and adding the global trend line ($slope_{20}$) from 1. Formula (C.2) shall be used, starting at Y0:

$$Y = DYB_0 + slope_{20} \cdot x \qquad \text{(C.2)}$$

where

Y is the additional yield in year *x* after starting point;

DYB_0 is the starting point of the dynamic yield baseline;

$slope_{20}$ is the global trendline;

x is the year after the starting point.

C.6.2.6 If the additionality measure is to replace the existing crop with a different (higher yield) crop on a delineated plot, the counterfactual situation is the cultivation of the existing crop. The dynamic yield baseline shall be determined based on historical yield and trend line data for the existing crop. The starting point of the baseline shall be the 3-year average of the crop yield obtained for the lower performing existing crop. The trend line is based on the global trend line data obtained from FAO World+ data statistics for the existing crop (see Table C.2). This approach shall only be used, if it can be demonstrated that the better performing crop can be introduced due to changes in the biofuel market, as demonstrated in the additionality assessment.

C.6.2.7 If an additionality measure is taken on a novel biofuel crop for which there is no FAO World+ data statistics as a basis for the global trend line, this trend line may be defined by using the slope of the most closely related crop derived from FAO World+ data statistics.

C.6.3 Setting dynamic yield baseline for perennial crops

C.6.3.1 Depending on the yield variation observed over the lifetime of each perennial crop, different methodological approaches are possible.

C.6.3.2 For palm trees, the following data may be used by organizations of oil palm plantations when determining their dynamic yield baseline:

a) the historical crop yields obtained prior to implementation of an additionality measure.

b) the planting year of palm trees on the delineated plot of land and/or their age profile;

c) the cultivars of palm trees on the delineated plot, if applicable;

d) the area of land replanted each year on a plantation, if applicable;

The organization shall combine this data with a growth curve applicable to the cultivars on the plot to determine the dynamic yield baseline. The key characteristic from the growth curve shall be the shape, not the magnitude of the yield. The curve gives the shape and it shall be combined with the data set out in items a) to d) to adjust the magnitude of the curve to the specific plot (i.e. adjustment on the basis of the historical yields and age of trees).

C.6.3.3 The following three options are available for determining the dynamic yield baseline for palm trees. The data required to set the dynamic yield baselines for these options shall include:

a) option 1a: standard growth curve:

   1) three most recent years of historical crop yields for palm trees grown on the delineated plot;

   2) age of trees on the delineated plot/planting year;

b) option 1b: growth curve provided by organization:

   1) three most recent years of historical crop yield for palm trees grown on the delineated plot;

   2) age of trees on the delineated plot/planting year;

   3) the cultivars of palm trees on the delineated plot;

   4) economic operator's own reference growth curve.

c) option 2: Group certification approach :

   1) for the three most recent years, the total hectares and total yield in fresh fruit bunches (FFB) for palm trees grown on the delineated plot/plantation(s), producing palm as part of the group.

Options 1a and 1b apply where the age profile of the trees on the delineated plot does not remain constant year after year. Option 2 may be applied when the age profile of the trees on the delineated plot remains constant year-on-year (i.e. in a group certification approach or if a constant percentage of the plantation area being replanted each year, resulting in a constant age profile for the trees).

Option 2 shall not be used if more than 20% of the volume in the group comes from the same plantation, or if more than 5% of the total area in the group is being replanted in the same year. In that case, option 1a or b shall be used to determine the baseline.

C.6.3.4 The standard growth curve (i.e. option 1a) uses the shape of an pre-established "standard" growth curve, based on existing scientific evidence, to estimate the dynamic yield baseline for a delineated plot, based on the three most recent years of historical crop yield data for that plot and the age of the palm trees when that yield was observed and using the annual percentage yield change from the standard curve to form a "business-as-usual" yield curve relevant to the specific plot. The standard curve has been normalised and is shown in Figure 1 and Table C.3 below.

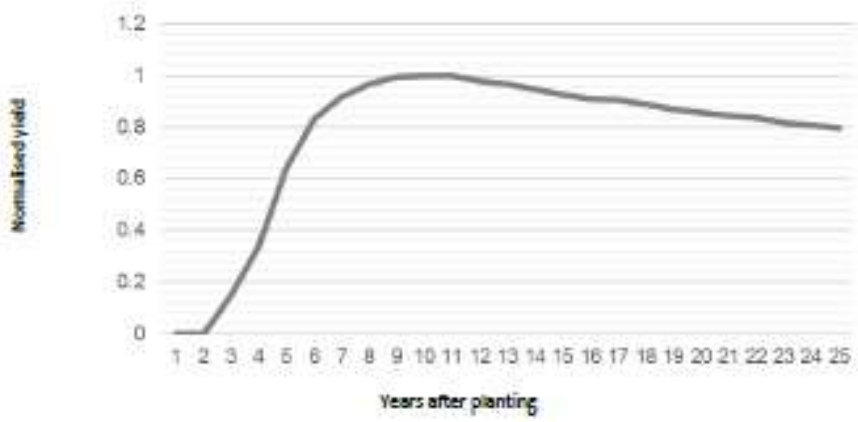


Figure 1 Normalised standard growth curve palm yield

Table C.3 Normalised standard growth curve palm yield data

Years after planting	1	2	3	4	5	6	7	8	9	10	11	12	13
Normalised yield	0	0	0.147	0.336	0.641	0.833	0.916	0.968	0.996	1	0.999	0.980	0.965
Years after planting	14	15	16	17	18	19	20	21	22	23	24	25	≥ 26*
Normalised yield	0.945	0.926	0.910	0.906	0.888	0.870	0.858	0.842	0.836	0.815	0.806	0.793	0.793

* After 25 years, the yield would be expected to continue to decline. However, as the typical lifetime of an oil palm tree is around 25 years, there is a lack of data to support the magnitude of the decline after 25 years. Therefore, a conservative approach is taken to assume that the yield curve would remain at the 25-year level.

When using option 1a, the organization shall take the following methodological steps:

1) To determine the average historical crop yield, collect the three most recent historical crop yields observed on the delineated plot prior to implementation of the additionality measure, as well as the corresponding age of the trees when those yields were observed;

2) calculate an average (mean) of the three historical crop yields observed on the delineated plot;

3) Based on the age of the trees when the historical yield data is from, determine where this average historical crop yield shall be on the standard growth curve (e.g. if the yield data is from trees aged 7, 8 and 9 years, the average historical yield should be considered to be year 8);

4) To determine the next point of the dynamic yield baseline, multiply the average historical crop yield from step 2 by the corresponding calculated annual percentage change, derived from the standard growth curve (Table C.4 below). Repeat this for each subsequent point to plot the dynamic yield baseline;

Table C.4 Annual percentage change in yield derived from standard growth curve

Years after planting	1 to 3	4	5	6	7	8	9	10	11	12	13	14
Annual percentage change	-	128.0 %	90.6%	30.0%	10.0%	5.6%	2.9%	0.4%	-0.1%	-1.9%	-1.6%	-2.0%
Years after planting	15	16	17	18	19	20	21	22	23	24	25	≥ 26*
Annual percentage change	-2.1%	-1.7%	-0.5%	-1.9%	-2.0%	-1.4%	-1.8%	-0.8%	-2.5%	-1.1%	-1.6%	0%

* After 25 years, the yield would be expected to continue to decline. However, as the typical lifetime of an oil palm tree is around 25 years, there is a lack of data to support the magnitude of the decline after 25 years. Therefore, a conservative approach is taken to assume that the yield curve would remain at the 25-year level.

5) To incorporate the global yield trend in the dynamic yield baseline, apply the compound annual growth rate (CAGR) calculated from FAOSTAT World+ yield data (Table C.5 below), to each point of the dynamic yield baseline to obtain the CAGR corrected dynamic yield baseline.

Table C.5 Compound annual growth rate palm (20-year)

Annual performance increase palm - business as usual	**1.37%**

Based on FAOSTAT World+ 2008-2017

C.6.3.5 The organization may provide the growth curve (option 1b) in exceptional cases. The organization shall demonstrate that option 1a is not appropriate for their specific case. In such a case, if the economic operator has an expected growth curve determined based on the available data of palm seedlings (that relates to their 'business-as-usual' scenario), that curve may be used as the basis for the dynamic yield baseline instead of using the standard growth curve. All steps described in Option 1a shall be followed, replacing the standard growth curve with the economic operator's own curve. The economic operator shall therefore calculate the annual percentage change.

The plot-specific growth curve shall still be corrected for global yield development using the CAGR calculated FAOSTAT World+ yield data (Table C.5).

C.6.3.6 In the case of group certification, or when a first gathering point or mill acts as the unit of certification, (option 2), the dynamic yield baseline may be set using a similar "straight line" dynamic yield baseline approach as used for annual crops. This approach may be used if a group manager, first gathering point or mill is seeking to certify a group that is taking the same additionality measure, and when the plantation or area supplying the mill contains a mix of ages of trees meaning that the annual yield supplying the mill has remained relatively constant.

To determine the dynamic yield baseline, the group manager shall record the total plantation area (ha) supplying the mill and the total yield (fresh fruit bunches) that corresponds to that area in each of the last 3 years. This is used to determine the yearly yield per hectare for each of the last 3 years (in tonnes/ha). These data points are then averaged and used as the starting point for the dynamic yield baseline. The starting point is combined with the global trendline slope for oil palm from FAOSTAT World+ data (Table C.2) to determine the dynamic yield baseline.

C.6.3.7 Sugar cane shall be treated as an annual crop when setting the dynamic yield baseline.

C.6.4 Setting dynamic yield baseline for sequential cropping

C.6.4.1 If multi-cropping practices such as sequential cropping are used, the economic operators have three options to calculate the additional biomass:

1) Demonstrate that the second crop does not lower the yield of the main crop.

2) If the second crop lowers the yield of the main crop:

   a. Determine a dynamic yield baseline for a system in which the main crop is the same each year;

   b. Determine a compensation factor for a system in which the main crop is different each year;

C.6.4.2 If an economic operator can demonstrate that the introduction of the second crop does not lower the yield of the main crop (option 1), the whole yield of the second crop can be claimed as additional biomass. This may be demonstrated, for example, by comparison of the observed yield of the main crop before (3-year historical average) and after introduction of the second crop.

C.6.4.3 If the main crop is the same each year (option 2a.), the baseline shall be determined based on at least the 3-year average historical yield of the main crop on that plot, combined with the global trend line for the main crop, as is done for annual crops.

This approach may also be used when the crop rotation follows a clearly defined rotation pattern that can be observed from historical data, which enables the business-as-usual situation to be clearly determined. In this case, it may be necessary to use data older than 3 years to determine the average historical yield of the main crop.

After implementation of sequential cropping, the net additional biomass shall be calculated as the difference between the total annual yield from the delineated plot of land (that is to say, the yield of the main crop plus the yield of the second crop) and the main crop dynamic yield baseline.

If the main and second crops are different feedstocks that produce a different combination of crop components (for example, oil, protein meal, starch, fibre), when the main crop and second crop yields are added together, the calculation shall be based on appropriate units of measurement to allow for the calculation of a single representative figure for the net additional biomass produced. Respectively, the methodology shall allow for an effective compensation of the biomass loss of the main crop. For example, the calculation can be done on a simple weight (tonnes) basis or an energy content basis (e.g. if the full second crop is used for energy, such as for biogas). The choice of methodology shall be justified by the economic operator and validated by the auditor.

C.6.4.4 If the main crop differs each year in the crop rotation and does not follow a regular pattern (option 2b), the economic operator needs to assess any loss in yield of the main crop due to the second crop and to take it into account in the volume of additional biomass claimed.

The economic operator shall compare the observed yield of the main crop after introduction of the second crop with the historical yield of the same (main) crop. That comparison may be done based on observed yields in neighbouring fields (e.g. if the same farm grows the same crops on rotation but in different fields), or on the basis of justified scientific literature that describes the impact of sequential cropping on those crops in that region.

The impact on yield of the main crop shall be translated into a compensation factor that shall be deducted from the volume of the second crop to calculate the additional biomass. As for Option 2a, the factor can be based on weight or energy content and shall allow for an effective compensation of the biomass loss of the main crop. The choice of methodology shall be justified by the economic operator and validated by the auditor.

C.7 Calculation of actual volume of low ILUC risk biobased raw material

C.7.1 After implementation of the additionality measure, organization shall record the actual crop yield achieved each year on the delineated plot to be able to determine the actual volume of low ILUC risk biobased raw material that may be claimed. This is done by comparing the crop yield achieved with the dynamic yield baseline. The auditor shall verify in the annual audit that the volume of additional biomass achieved is in line with the projections in the management plan, and seek justification if there are discrepancies of more than 20% compared to the estimates in the management plan.

C.7.2 If the organization is seeking certification for an additionality measure applied in the past, the additional biobased raw material yield may be calculated and recorded in the management plan. While this allows the actual volume of low ILUC risk biobased raw material to be precisely calculated, low ILUC risk biobased raw material may only be claimed after low ILUC risk certification has been awarded. Retrospective claims cannot be made for agricultural biomass supplied in the past.

C.7.3 To calculate the additional volume, the organization shall record the full crop yield, x_Y (expressed in tonne/ha), from the delineated plot for each year Y from the start of the implementation of the additionality measure. The organization shall prove the link between the specific delineated plot and the crop yield achieved.

C.7.4 If the harvested volume is only measured (weighed) at a first gathering point where products from multiple production locations or plots arrive, then the documentation from the first gathering point may be used as proof of the harvested volume (yield) for the production locations and plots involved. A record of the business transaction between the organization of a particular production location and the first gathering point may be used as evidence, as long as the link back to the specific delineated plot can be proven. In this case, the organization acting as first gathering point is responsible for collecting and recording the crop yield data. This organization shall record yields of agricultural biomass collected per production location and, if necessary, for a specified delineated plot on this production location. In the case of a group (or regional organization) in which the first gathering point acts as group leader, the group leader shall be responsible for recording yield data for all delineated plots.

C.7.5 To calculate the additional volume of biobased raw material, the crop yield data obtained for a given year shall be compared to the dynamic yield baseline. The additional biobased raw material yield, Δx (expressed in tonne/year), is equal to the difference between the crop yield observed and the yield projected by the dynamic yield baseline (DYB) for the same year (both expressed in tonne/ha/year), multiplied by the surface area, A (expressed in ha), of the delineated plot in question as presented in Formula (C.4):

$$\Delta x = (x_{x+4} - x_{x+4DYB}) \times A \qquad \text{(C.4)}$$

This additional volume can be claimed as low ILUC risk biobased raw material

C.7.6 The organization shall be able to justify large deviations from the actual yield compared to the expected yield.

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