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REDIIBIO project

Technical Assistance to develop guidance for the implementation of the new bioenergy sustainability criteria set out in the revised Renewable Energy Directive

3rd Progress Report – for stakeholder consultation

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1 INTRODUCTION

The purpose of this report is to present the results and outcomes of the REDIIBIO project (status 18th of June 2020).

1.1 Background to the project

The existing Renewable Energy Directive 2009/28 (RED)¹ lays down the policy framework to promote renewable energy in the European Union, including achieving an overall 20% share of renewable energy by 2020 and the related national renewable energy targets. On 1 July 2021, the RED will be repealed by the recast of the Renewable Energy Directive (EU) 2018/2001 (REDII)², which sets the framework for the promotion of renewable energy in the European Union from 2021 to 2030.

Bioenergy is the main renewable energy source consumed in the EU, accounting for over 10% of EU final energy consumption and about 60% of renewable energy consumption in 2017. Bioenergy is a very versatile form of energy: it is storable, dispatchable and can contribute to all the final usage forms of energy i.e. heat, transport and electricity. Europe is world leader in bioenergy heating/cooling technologies³. 95% of bioenergy used in the EU is sourced domestically, mainly from forest biomass (70%). The bioenergy sector creates 703,200 jobs and it has a turnover of 66.6 billion euros⁴.

Bioenergy can deliver significant GHG emission reductions compared to fossil fuels, thus contributing to the EU climate and environmental objectives. However, if produced in an unsustainable way, there are risks of negative environmental impacts that need to be managed by public and private policies.

In this context, the RED sets out mandatory sustainability criteria for biofuels and bioliquids, in order to avoid direct impacts on high biodiversity lands and high carbon-stock lands (land criteria), to optimize the direct GHG benefits (GHG emission saving criteria)⁵. However, these criteria do not apply to solid and gaseous biomass used in heat and power.

REDII further strengthens the EU bioenergy sustainability criteria by extending their scope to cover also large-scale use of biomass and biogas in heating & cooling and electricity generation (e.g. in installations with total a rated thermal input equal to or exceeding 20MW in the case of solid biomass fuels and equal or exceeding 2MW for gaseous biomass fuels)⁶.

In addition, REDII introduces the following changes to the EU sustainability criteria for bioenergy:

- Application of the RED land criteria to agricultural biomass, irrespective of the final use in energy
- New criterion addressing soil quality and soil carbon impacts of agricultural waste and residues
- New criterion avoiding the production of agricultural biomass from highly biodiverse forests
- New risk-based sustainability criteria specific for forest biomass
- New minimum GHG saving criteria for biomass and biogas used for large-scale heating & cooling and electricity generation

¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0028&from=EN>

² <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L2001&from=EN>

³ Study on the "Competitiveness of the Renewable Energy Sector", conducted by COWI and CEPS for the Directorate-General for Energy (DG ENER) of the European Commission (EC). https://ec.europa.eu/energy/studies/competitiveness-renewable-energy-sector_en

⁴ EurObserv'ER 2019, the State of Renewable Energy in Europe. <https://www.eurobserv-er.org>

⁵ RED was amended in 2015 by the ILUC Directive <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L1513&from=EN>

⁶ According to REDII, article 29, Member States may apply stricter sustainability and greenhouse gas emissions saving criteria, including to installations with lower total rated thermal input.

- New efficiency criteria for large-scale electricity-only installations using biomass and/or biogas

As set out in Article 30 of REDII, Member States are responsible for the implementation of the EU bioenergy sustainability criteria. To this end, they must require economic operators (i.e. bioenergy producers) to show that the biofuels, bioliquids and biomass fuels concerned comply with the relevant land sustainability criteria (related to land use), GHG saving criteria, and energy efficiency requirements⁷. Economic operators have two methods to do this: by providing the relevant national authority with data/evidence required under the Directive; or, by using 'voluntary' certification schemes recognized by the Commission. Member States have to require that economic operators arrange for an adequate standard of independent auditing of the information submitted.

1.2 Overview of the project

REDII requires the Commission to adopt an implementing act setting out operational guidance for demonstrating forest biomass criteria Art 29 (8) REDII, by 31 January 2021. In addition, the Commission is planning to develop non-binding guidance also on the new agricultural biomass criteria in order to facilitate a harmonized implementation across the EU.

The REDIIBIO project provides technical assistance to the Commission for the efficient implementation of the new sustainability criteria for forest and agricultural biomass under the REDII (call for tender ENER/C1/2019-439). The general objective of the REDIIBIO project is to develop a range of approaches to implement the new sustainability criteria for forest and agriculture biomass as they stand, including identifying tools to demonstrate compliance. The review of the sustainability criteria as defined in the REDII is outside of the scope of this project.

The REDIIBIO project has developed a set of country sheets⁸ and case studies in order to test the proposed approaches. Details on and findings from these country sheets and case studies are presented in Appendix B, Appendix C and Appendix D. Please note that these country sheets and case studies are developed as one-off exercise for illustrative purposes and will not be updated overtime. As such, they do not hold any legal value and do not represent the official view of the European Commission.

1.3 Structure of this report

In the following chapters discuss the implementation of the new REDII sustainability criteria on forest biomass (Chapter 2) and on agricultural biomass (Chapter 3). Each chapter explains the relevant definitions, describes a stepwise approach for implementation and identifies tools to demonstrate compliance. Chapter 4 provides background and guidelines regarding the implementation of the chain of custody and mass balance. Appendix B provides details and results of the country sheets as developed as test cases for the application of the level A route for forest biomass. Appendix C provides details and results on the case studies on forest biomass as developed as test cases for the application of level B route for forest biomass. Appendix D provides details and results on the case studies as developed as test cases for the application of methodologies developed for the new agricultural biomass criteria.

⁷ See Communication from the Commission on the practical implementation of the EU biofuels and bioliquids sustainability scheme and on counting rules for biofuels (2010/C 160/02).

⁸ Country sheets were only developed as examples of the application of level A compliance demonstration for the forest biomass sustainability criteria. Country sheets were only developed for a limited selection of countries/regions.

2 TASK 1 – GUIDANCE ON FOREST BIOMASS SUSTAINABILITY CRITERIA

The purpose of Chapter 2 is to provide guidance on the implementation of the new sustainability criteria on forest biomass, as set out in Article 29.6 and 29.7 of REDII. This guidance includes: 1) explaining the relevant concepts and definitions; 2) describe a stepwise approach to apply the sustainability criteria; 3) identify relevant checklists of evidence to demonstrate sustainability compliance.

2.1 Introduction

As stated in the recital 102 of REDII, “woody raw material should only be sourced from forests that are harvested in accordance with the principles of sustainable forest management that are developed under international forest processes⁹ and that are implemented through national law or best management practices at sourcing area level. Operators should take the appropriate steps to minimise the risk of using unsustainable forest biomass for the production of bioenergy and ensure that carbon stocks can be tracked. To that end, operators should put in place a risk-based approach”.

REDII includes two sets of sustainability criteria for forest biomass:

1. One set of criteria in Article 29.6 which aim is to **minimise the risk of using forest biomass derived from unsustainable production**; and
2. One set of criteria 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 can be demonstrated in two ways:

- Level A): the harvesting criteria are complied with by the national or subnational legislation applicable in the area of harvest, as well as monitoring and enforcement systems.
- Level B): for each criterion for which compliance cannot be demonstrated at national or subnational level, compliance needs to be demonstrated through management systems applicable to the forest sourcing area level.

These sustainability criteria apply to all forest biomass used for the production of biofuels, bioliquids and solid and gaseous biomass fuels consumed in the EU. Forest biomass includes logs, logging residues (e.g. branches, tree-tops, stem parts, small-diameter trees), stumps and roots, which are directly generated by forestry.

These criteria do not apply to¹⁰:

- Processing residues from forest-based industries, such as sawdust and wood shavings that result from sawmilling or wood milling (Article 2.44). To avoid the risk of fraud, the Directive clarifies that processing residues shall not be a primary aim of the production process and the process shall not be deliberately modified to produce them (Article 2.43).

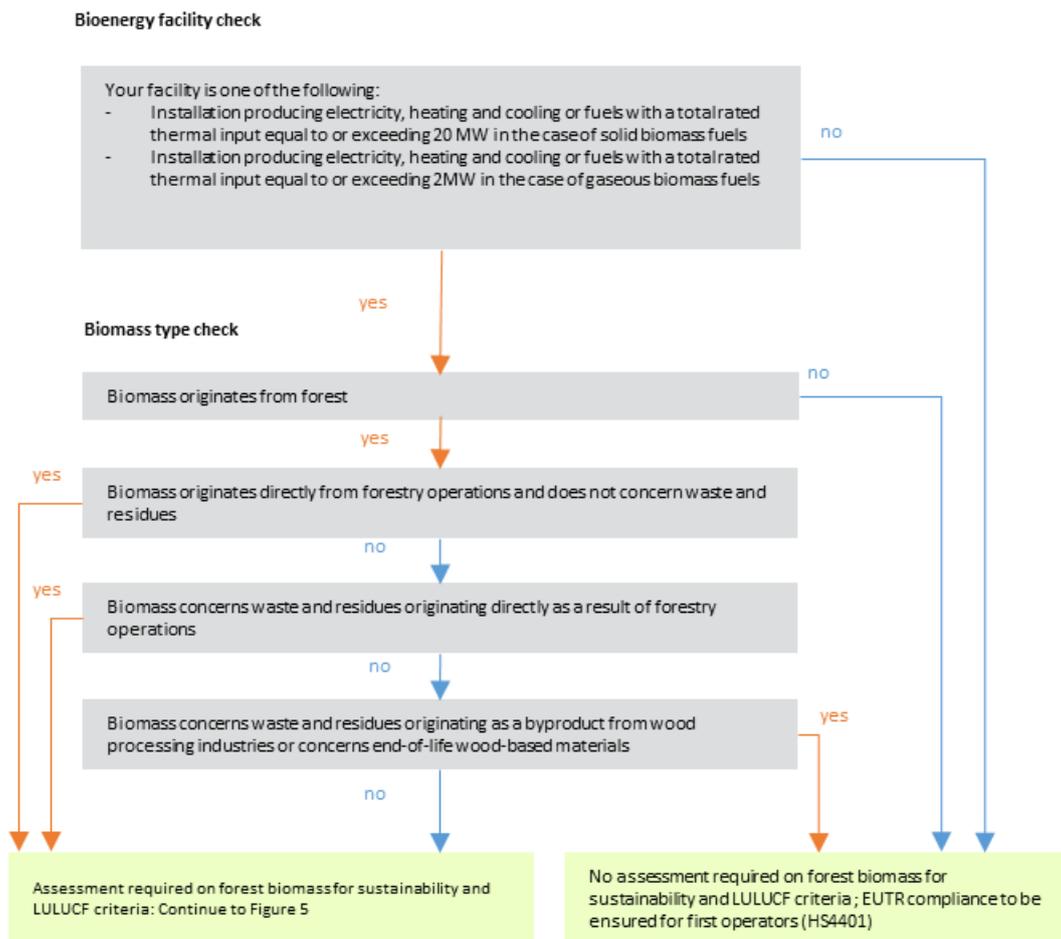
⁹ E.g. ITTO (https://www.itto.int/sustainable_forest_management/criteria_indicators/), Forest Europe (<https://foresteurope.org/>), The Montréal Process (<https://www.montrealprocess.org/>)

¹⁰ Evidence that the biomass stream is not a primary forestry residue but residue or waste stream from later in the supply chain (e.g. secondary residue such as sawdust) would then need to be provided so that a third party can verify that compliance with the sustainable harvesting and LULUCF criteria are not required.

- Wood wastes (e.g. discarded furniture, wood that was used in construction) that are being repurposed and further processed into biofuels, bioliquids and biomass fuels¹¹. However, according to the Directive, wastes have to fulfil the greenhouse gas emissions saving criteria laid down in Article 29 paragraph 10.

For electricity and heating produced from biomass fuels, compliance with the criteria has to be checked for installations with a total rated thermal input equal to or exceeding 20MW in the case of solid biomass fuels and equal or exceeding 2MW for gaseous biomass fuels (Article 29.1 of REDII). Figure 2 provides a decision tree to check whether biomass should be subject to the new forest biomass sustainability criteria.

Figure 1. Decision tree to assess if compliance with the forest biomass criteria is required



Note: Even if REDII criteria do not apply, the EU Timber Regulation needs to be complied with for a range of wood-based energy commodities (e.g. as listed under HS code 4401)¹².

¹¹ The EU Waste Directive specifies waste as any substance or object which the holder discards or intends or is required to discard (2008/98/EC).

¹² See the EU Timber Regulation product scope: https://ec.europa.eu/environment/forests/timber_regulation.htm

2.2 Article 29.6: Harvesting criteria

2.2.1 Legal text

Article 29.6 (REDII) requires economic operators to ensure that biofuels, bioliquids and biomass fuels produced from forest biomass meet a number of **sustainable harvesting criteria**, as reported in the box below.

Box 1: Legal text of the REDII Article 29.6 relating to the sustainable harvesting criteria

Biofuels, bioliquids and biomass fuels produced from forest biomass taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 [of Article 29] shall meet the following criteria to minimise the risk of using forest biomass derived from unsustainable production:

(a) *The country in which forest biomass was harvested has national or sub-national laws applicable in the area of harvest as well as monitoring and enforcement systems in place 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

(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) *When evidence referred to in point (a) of this paragraph is not available, the biofuels, bioliquids and biomass fuels produced from forest biomass shall be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 [of Article 29] if management systems are 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.

2.2.2 Relevant definitions and concepts

This section explains the relevant definitions related to the harvesting criteria set out in Article 29.6, in the order as they appear in the legal text.

(a1) 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 or regional competence. In the latter case, all regions need to comply with a criterion so that a country can be considered to pass it at “level A”.

The regional level can be referred to differently depending on the country. In federal countries, like Austria (10 Länder), Belgium (2 regions), Canada (10 provinces), Germany (16 Bundesländer) and the United States of America (US, 50 states), or in decentralized countries like Spain (17 regions) and Italy (20 regions), important parts of the legislative power in the area of forestry were transferred from the country level to the sub-national level. Note 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 legislation.

(a2) 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 (e.g. field checks, inventory, remote sensing), while **enforcement systems** will 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).¹³

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 are 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 robust evidence from international or national government organizations of *significant* and *systematic* lack of enforcement, caused for instance by widespread corruption of forest enforcement authorities or continued unaddressed illegality (source of information would be international government organisations, such as the UNEP-WCMC briefing notes for third countries or the Commission infringement procedures for EU countries).

For example in context of the legality criterion, the EU Member States have to implement 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 to ensure that they fulfil their obligations under the EUTR, or to sanction if obligations would not be fulfilled¹⁴. 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 would have demonstrated lacking implementation of the regulation.

¹³ Mark A. Cohen, 1998. Monitoring and Enforcement of Environmental Policy. Owen Graduate School of Management, Vanderbilt University, Nashville TN.

¹⁴ Nominated competent authorities for implementation of the Regulation EU 995/2010:
https://ec.europa.eu/environment/forests/pdf/list_competent_authorities_eutr.pdf

More examples of monitoring and enforcement systems regarding the harvesting can be found in the country sheets included in Appendix B.

(b1) Management system

The term ‘**management system**’ means an information management system¹⁵ 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). This management system is 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 ensures that information necessary to demonstrate compliance with all sustainability criteria is collected, verified, assessed and durably stored by the economic operator. 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 proposed in this report (see section 2.2.5), can be used to help define the information requirements, identify available information sources, and assess the available information.

(b2) Forest sourcing area

According to Article 2.30 of REDII, 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*”.¹⁶ This definition implies:

- A “geographically defined area”: The area of origin, from which the forest biomass feedstock is sourced, is known and can be shown on a map, typically on the basis of administrative boundaries.
- “From which reliable and independent information is available”: Information required to assess compliance with the REDII criteria is available from reputed organizations, public or private, which have the competence to produce reliable information.
- “Where conditions are sufficiently homogenous to evaluate the risk of the sustainability and legality characteristics of the forest biomass”: this means in the first place that within the area, the legislation covering the issues in the sustainability criteria, shall be the same. If an economic operator’s supply base spreads over two countries or regions where the issues 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.

This definition of sourcing area does not specifically refer to the size of the area, but rather to a sufficient level of information for the respective area that is required.

The sustainability criteria apply only to electricity and heating from biomass fuels produced in installations with a total rated thermal input equal to or exceeding 20 MW in the case of solid biomass fuels. Such facilities, when using solid biomass fuels, can have a sourcing radius of about 70 km or even larger¹⁷.

The following Figure 2 shows four examples of different scenarios for the division of an operator’s supply base into forest sourcing areas.

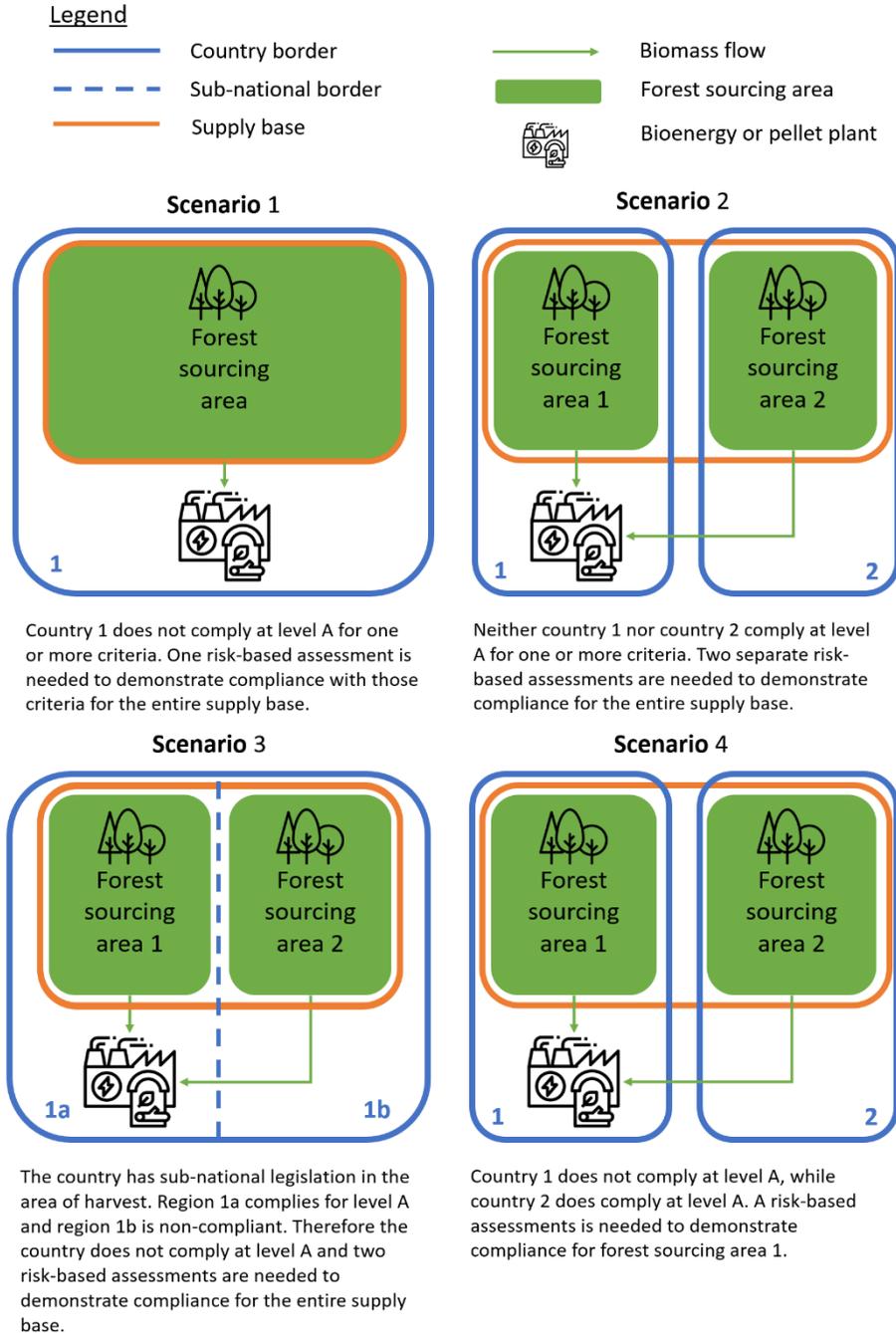
¹⁵ A management system can consist of a collection of steps.

¹⁶ Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources.

¹⁷ Cavallo, A., et al. (2018). "Operating Results of a 20MW Biomass Generating Plant in Italy and a GIS Analysis for Exploiting Wood Availability." *Journal of Clean Energy Technologies* 6(4): 314-319. DOI: 10.18178/JOJET.2018.6.4.48.

Figure 2. Examples of forest 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



(i) Legality of harvesting operations

In line with the EUTR¹⁸, the term '**legality of harvesting operations**' means that forest biomass harvesting activities shall comply with 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 further information on the EUTR, 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, as well as to the country risk profiles available on the Commission website¹⁹.

(ii) 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).

- Example 1: A final cut was applied to a forest and the biomass was removed. On the site already existing, seedlings and seeding from seed trees that were left from the previous forest already will form the basis for the new forest.
- Example 2: A forest was removed. On the site no seedlings exist. The forest is re-established through planting of seedlings from a nursery.

(iiia) 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 protected areas are to be clearly defined. In cases when biomass extraction would be permitted, it can only be done without impacting the protection purposes of the area (see iiib).

Designated areas can be classified according to management categories, following the International Union for Conservation of Nature (IUCN) classification system: (Ia) strict nature reserve; (Ib) wilderness area; (II) national park; (III) natural monument or feature; (IV) habitat/species management area; (V) protected landscape/seascape; (VI) protected area with sustainable use of natural resources. IUCN maintains the World Database on Protected Areas (WDPA), the most comprehensive global database on protected areas.

(iii-b) 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 nature protection purpose is still possible. In case harvesting is

¹⁸ Regulation (EU) no 995/2010 of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market. Official Journal of the European Union, L 295/23. Article 2 (h). <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:295:0023:0034:EN:PDF>

¹⁹ https://ec.europa.eu/environment/forests/timber_regulation.htm

lawfully implemented on a designated area, then it has to be carried out in a way that it meets the 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.²⁰

For example, the Habitats Directive 92/43/EEC²¹ 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 a way that it meets the requirement of the designated site. 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.

(iv) 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. '**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 waterways²². Furthermore, forests on wet soils that are easily compacted by heavy machinery could be harvested in winter when the ground is frozen.

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 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 space²³. '**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 as much as possible.

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.

An example is a pre-harvesting inventory of a logging site which registered the occurrence of endangered tree species. A harvesting plan should then document the practical steps taken at harvesting 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 fungus and saproxylic beetles. Harvesting is therefore implemented according to plans that specify minimum

²⁰ IUCN, 2019. World Database on Protected Areas (WDPA). URL accessed on 20191105: <https://www.iucn.org/theme/protected-areas/out-work/quality-and-effectiveness/world-database-protected-areas-wdpa>

²¹ Council Directive 92/43/EEC of 21 May 1992.

²² Definition by the authors of this report, based on - Mantau, U. et al. 2010: EUwood - Real potential for changes in growth and use of EU forests. Methodology report. Hamburg/Germany, June 2010. 165 p.

²³ Thompson, I., et al., 2014, Forest resilience, biodiversity, and climate change: a synthesis of the biodiversity, resilience, stability relationship in forest ecosystems, Technical Series No 33, Secretariat of the Convention on Biological Diversity, Montreal, Canada.

amounts of these dead tree trunks to be left in the forest, which is confirmed afterwards as part of a post-harvest inspection.

(v) Long-term production capacity of forests

This term ‘**long-term production capacity**’ refers to the management of forests to sustainably deliver products and services over a long period of time bridging several successive forestry rotations.

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

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.²⁴

Examples of how the production capacity can be maintained, at country level or at forest sourcing area level, include the following possible measures: the harvested biomass does not exceed the net annual increment; residue harvest is not conducted on poor or vulnerable soils (according to local soil maps and guidelines); harvest of foliage is omitted; significant shortening of the rotation length is prevented as that could jeopardise present forest functions and services (for example when a high forest would be converted to a short-rotation forest).^{25, 26}

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. Measures would need to be in place on the extraction sites to prevent large nutrient losses.

An estimate of the net annual increment (NAI) of the forest - i.e. the net amount of stemwood that grows over a year’s time - is needed to determine 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.

2.2.3 Stepwise approach for demonstrating compliance through national or sub-national laws (level A)

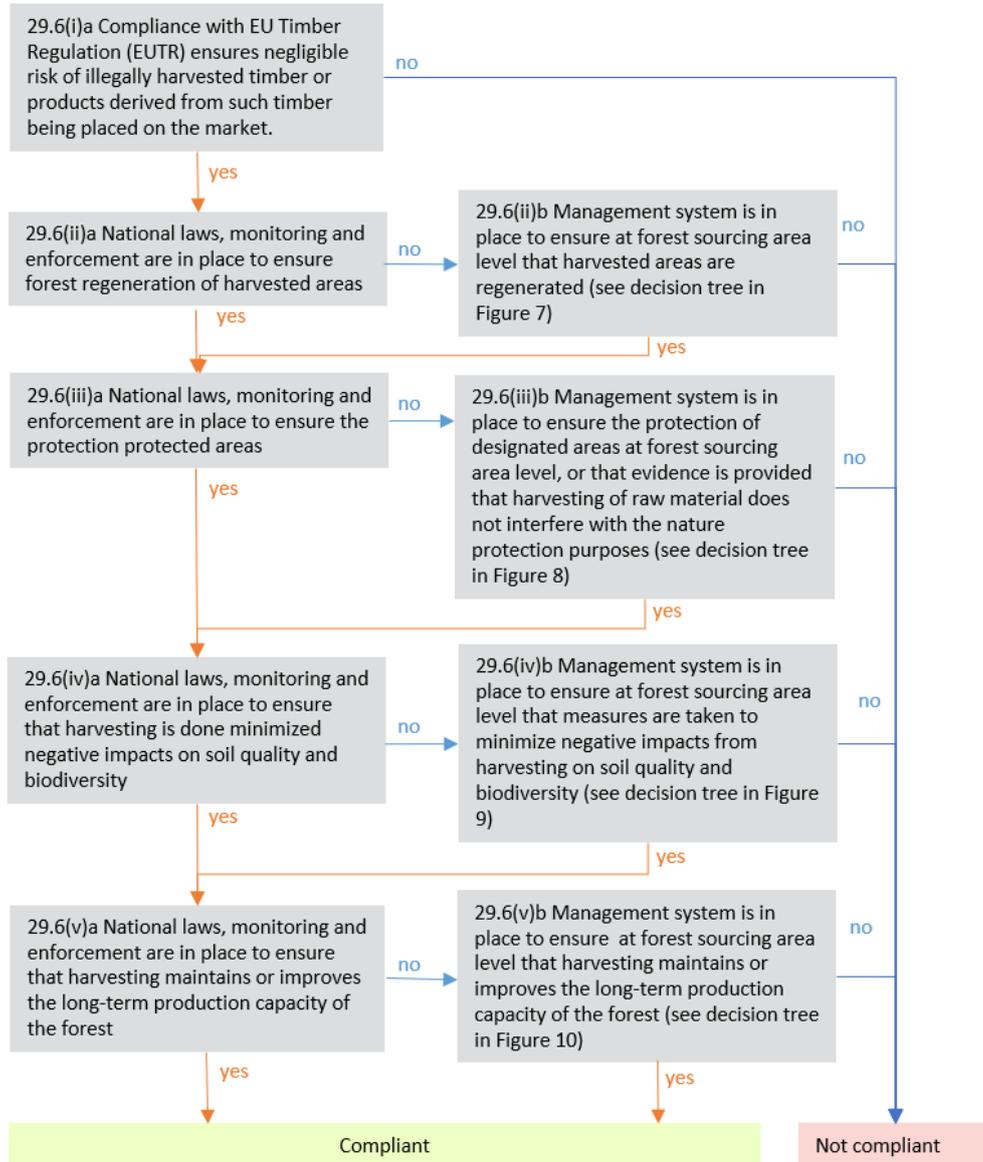
Figure 3 depicts the stepwise approach to demonstrate compliance with the harvesting criteria through national or sub-national legislation (level A). For each criterion for which such evidence is not available, the economic operator needs to demonstrate compliance through management systems at forest sourcing level (level B).

²⁴ D.L. Achat et al. / Forest Ecology and Management 348 (2015) 124–141.

²⁵ Vis, M & Dees, M (Eds.), 2011. Biomass Resource Assessment Handbook: Harmonisation of Biomass Resource Assessments, Best Practices and Methods Handbook. VDM Verlag Dr. Müller. 256pp. ISBN-13: 978-3639290189.

²⁶ Mantau, U. et al. 2010: EUwood - Real potential for changes in growth and use of EU forests. Final report. Hamburg/Germany, June 2010. 160 p.

Figure 3. Decision-tree for demonstrating compliance with the harvesting criteria through national or sub-national legislation



Note: The text boxes 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 forest sourcing area (level B). Level A requires that laws, monitoring and enforcement systems are in place at country level to ensure the respective criteria are fulfilled. If a criterion is not fulfilled at country level, then the assessment by an economic operator requires a management system to ensure compliance at the level of the 'forest sourcing area'.

2.2.4 Checklist for demonstrating compliance through national or sub-national laws (level A)

Table 1 provides a checklist of types of proof and possible information sources to demonstrate sustainability compliance at level A, without however specifying benchmark requirements that would allow qualitative assessment of a country's laws, as the latter is outside the scope of REDII requirements.

Table 1. Checklist for demonstrating compliance with the harvesting criteria through national or sub-national laws (level A)).
Note that the criteria are referred in abbreviated format, while the wording of REDII remains the official reference

REDII Criteria		Requirement	Type of proof	Possible information sources
29.6a(i)	Harvesting legality	Laws	<ul style="list-style-type: none"> Certificate of due diligence required under the EU Timber Regulation (EUTR, (EU) 995/2010) 	<ul style="list-style-type: none"> 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
29.6a(i)	Harvesting legality	Monitoring/ Enforcement	<ul style="list-style-type: none"> Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement 	<ul style="list-style-type: none"> The UNEP-WCMC briefing notes on EUTR implementation: www.unep-wcmc.org/featured-projects/eu-timber-regulations-and-flegt
			<ul style="list-style-type: none"> Proof that the relevant Member States is not subject to any on-going EU infringement procedure for non-compliance with the EU Timber Regulation 	<ul style="list-style-type: none"> For information on EU infringement procedures, query for "MISCELLANEOUS - FORESTS - Non compliance with EUTR and FLEGT Regulations" in the query form's Title field: https://ec.europa.eu/info/law/infringements_en
29.6a(ii)	Forest regeneration	Laws	<ul style="list-style-type: none"> Legal analysis showing that the relevant legislation complies with the forest regeneration criteria 	<ul style="list-style-type: none"> 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
29.6a(ii)	Forest regeneration	Monitoring/ Enforcement	<ul style="list-style-type: none"> Legal analysis showing that the relevant forest legislation includes monitoring and enforcement requirements for forest regeneration 	<ul style="list-style-type: none"> 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
			<ul style="list-style-type: none"> Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement 	<ul style="list-style-type: none"> The UNEP-WCMC briefing notes on EUTR implementation: www.unep-wcmc.org/featured-projects/eu-timber-regulations-and-flegt
29.6a(iii)	Protected areas	Laws	<ul style="list-style-type: none"> Legal analysis showing that the relevant legislation complies with the protect areas requirement 	<ul style="list-style-type: none"> 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. European Environment Agency Common Database on Designated Areas for all its 36 member countries. https://www.eea.europa.eu/data-and-maps/data/nationally-designated-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.

REDII Criteria		Requirement	Type of proof	Possible information sources
29.6a(iii)	Protected areas	Monitoring/	<ul style="list-style-type: none"> Legal analysis showing that the relevant forest legislation includes monitoring and enforcement requirements for protected areas 	<ul style="list-style-type: none"> 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.
		Enforcement	<ul style="list-style-type: none"> Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement 	<ul style="list-style-type: none"> The UNEP-WCMC reports on EUTR implementation: www.unep-wcmc.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.
29.6a(iv)	Maintenance of soil quality and biodiversity	Laws	<ul style="list-style-type: none"> Legal analysis showing that the relevant legislation complies with the maintenance of soil quality and biodiversity criteria 	<ul style="list-style-type: none"> 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.
29.6a(iv)	Maintenance of soil quality and biodiversity	Monitoring/	<ul style="list-style-type: none"> Legal analysis showing that the relevant forest legislation includes monitoring and enforcement requirements for protected areas 	<ul style="list-style-type: none"> 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.
		Enforcement	<ul style="list-style-type: none"> Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement 	<ul style="list-style-type: none"> The UNEP-WCMC reports on EUTR implementation: www.unep-wcmc.org/featured-projects/eu-timber-regulations-and-flegt
29.6a(v)	Long-term production capacity	Laws	<ul style="list-style-type: none"> Legal analysis showing that the relevant legislation complies with the long-term production capacity criteria 	<ul style="list-style-type: none"> 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.
29.6a(v)	Long-term production capacity	Monitoring/ Enforcement	<ul style="list-style-type: none"> Legal analysis showing that the relevant forest legislation includes monitoring and enforcement requirements for long-term production capacity 	<ul style="list-style-type: none"> 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.

REDII Criteria		Requirement	Type of proof	Possible information sources
			<ul style="list-style-type: none"> • Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement 	<p>The UNEP-WCMC reports on EUTR implementation: www.unep-wcmc.org/featured-projects/eu-timber-regulations-and-flegt</p>

2.2.5 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 at the forest sourcing area level (level B evidence). 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.

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 assumed to be the same for level A and level B. For further clarification on the link between REDII and EUTR see Section 2.2.2 (i) Legality of harvesting operations. For summary guidance on compliance with the REDII legality criterion, see Section 2.2.3. The following guidance therefore applies to the remaining criteria (ii) to (v).

This section presents a stepwise approach for each criterion, followed by the related checklist including specific indicators and type of proof of compliance. The checklists were prepared based on best practices applied in the industry. Given that specific situation of a legal system, including silvicultural approaches can differ considerably between countries and regions, the checklists are not exhaustive.

Figure 4 shows the stepwise approach for demonstrating compliance with the **regeneration criterion**. Key steps include: whether the forest biomass results from final felling (step 1.1), from a thinning (step 1.2 and step 1.3) or from a calamity (step 1.3); and when regeneration is required, supplier contracts should commit to ensure this will be done in an appropriate manner (step 2). A final felling can be a clear-cut, or it can be the removal of the oldest generation of trees in the upper storey, while leaving the trees in the understorey intact.

Table 2 presents the checklist for demonstrating compliance with the regeneration criterion.

Figure 4. Stepwise approach for compliance with the regeneration criterion

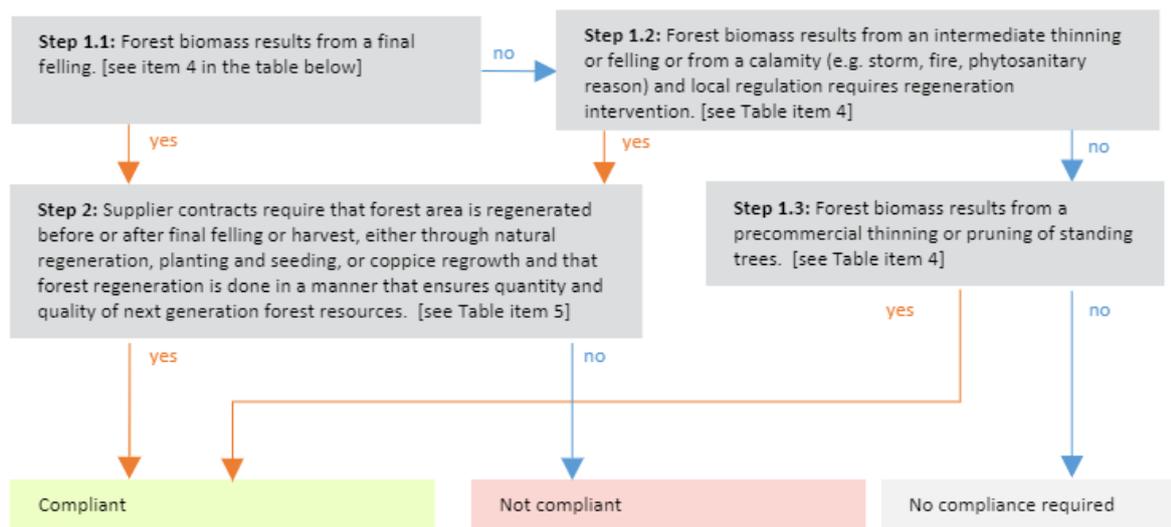


Table 2. Checklist for the regeneration criterion

Item No.:	Indicator	Sources for verification of the indicator
4	Type of forest operation from which forest biomass results (final felling, thinning).	Operational reports/harvest protocols specify type of forest operation from which forest biomass stems from (final felling or thinning). Must be specified for each consignment.
5	Securing of forest regeneration is done in a manner that ensures quality and quantity of next generation forest resources.	Provision of forest management plans that include a regeneration goal regarding species composition and establishment period, as well as identified measures to prevent abiotic and biotic hazards. Must be specified for each stand individually.

Figure 5 shows the stepwise approach for demonstrating compliance with **the criterion on protected areas**. This criterion requires that if the forest sourcing area comprises of areas designated for nature protection including wetlands and peatlands, that evidence is produced to ensure that: conditions and restrictions for harvesting from such areas are known; and compliance with these conditions and restrictions can be demonstrated; as well as that permission by the relevant competent authority for the biomass harvesting is available.

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

Figure 5. Stepwise approach for compliance with the protected area criterion

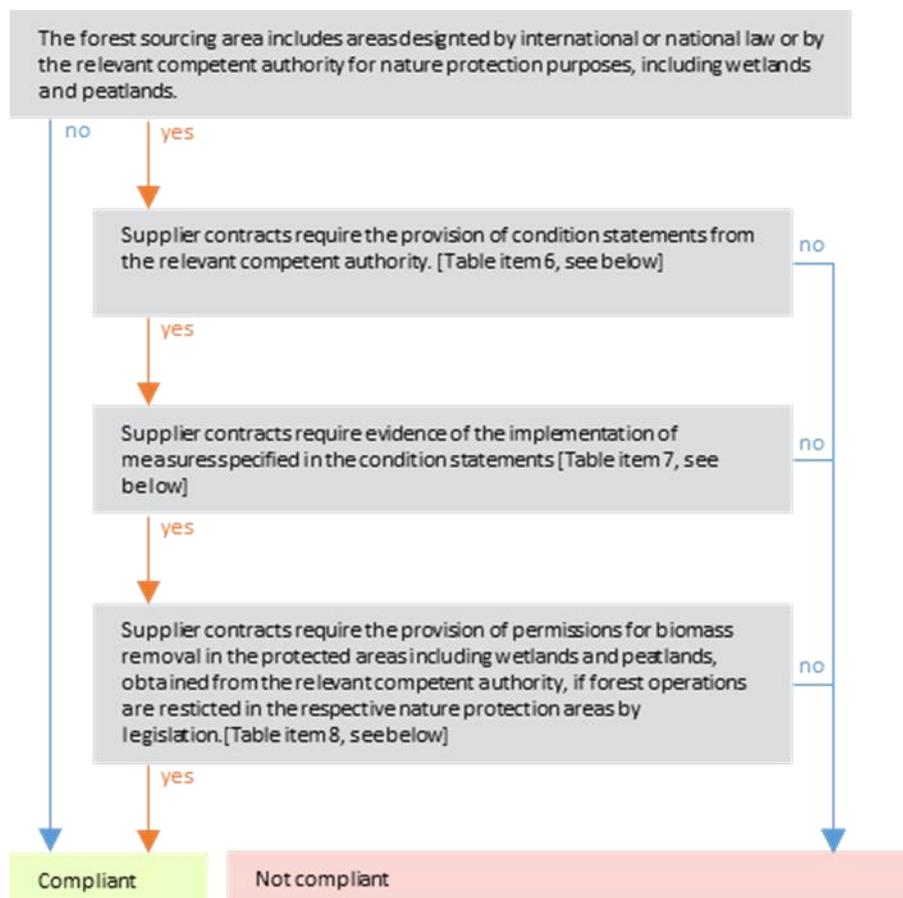


Table 3. Checklist for the protected areas criterion

Item No.:	Indicator	Sources for verification of the indicator
6	Condition statements from statutory bodies regarding protected areas including stipulated measures and prohibitions in the protected areas, including wetlands and peatlands	<ul style="list-style-type: none"> • Provision of condition statements by the relevant competent authority by the supplier. • Must be provided upon every consignment originating partly or fully from nature protection areas.
7	Evidence of implementation of plans/measures in nature protection areas	<ul style="list-style-type: none"> • Provision of relevant operational reports for measures undertaken in the respective areas, to show proof of compliance with the condition statements of the relevant competent authority. • Alternatively, the latest confirmation from the relevant competent authority that proofs the necessary measures/prohibitions are complied with. These confirmations can for example be obtained via field-inspections with an agent of the relevant competent authority and are conducted periodically as prescribed by the relevant competent authority. • Must be provided upon every consignment originating partly or fully from nature protection areas.
8	Permissions for biomass removal in protected areas including wetlands and peatlands	<ul style="list-style-type: none"> • If forest operations are restricted by law in the respective nature protection area, the second party must provide a harvesting permission issued by the relevant competent authority. The harvesting permission should specify the species, amounts and locations where these can be logged from. • 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.

Figure 6 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 impacts from harvesting on soil. When the sourcing area comprises poor or vulnerable soils, then evidence needs to exist that logging is done with the correct logging permit, while taking precautionary soil protection measures into account. For stumps and roots, proof is to be provided that such biomass does not originate from vulnerable soils. For the biodiversity part of the criterion (steps 5 and 6), supplier contracts are to require that harvesting operations take biodiversity attributes into consideration. Avoidable damages should not occur, and negative impacts should be minimized.

Table 4 presents the checklist for demonstrating compliance with **the soil and biodiversity criterion**.

Figure 6. Stepwise approach for compliance with the maintenance of soil quality and biodiversity criterion

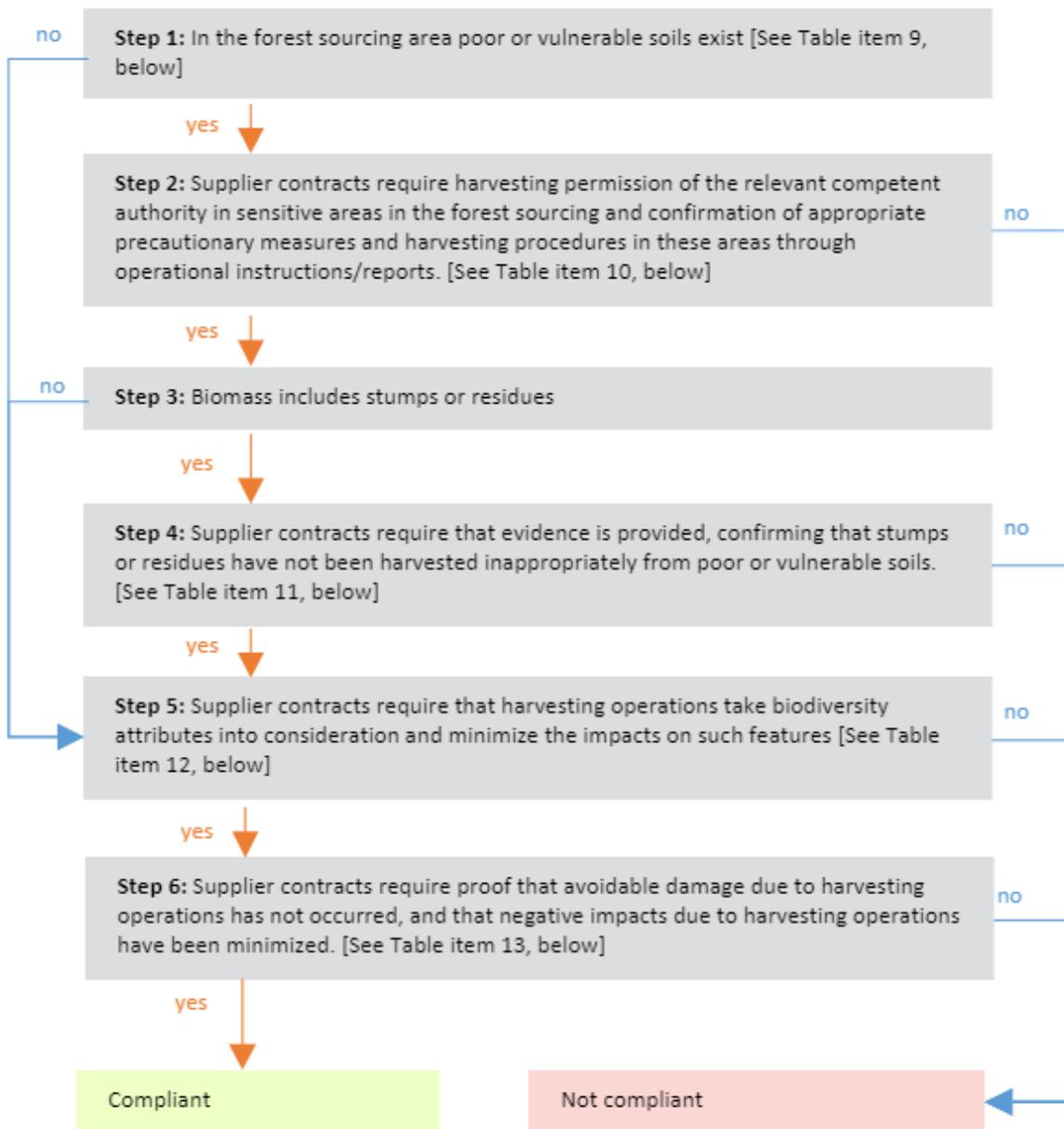


Table 4. Checklist for the maintenance of soil quality and biodiversity criterion

Item No.:	Indicator	Sources for verification of the indicator
9	The existence of poor or vulnerable soils in the forest sourcing area.	<p>Sensitive areas in the forest sourcing area are identified on the basis of soil maps, soil sensitivity maps by the operator or supplier or through the provision of detailed field inventory data.</p> <p>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 with own or third-party expertise with regard to sensitivity including soil type, slope, and soil quality.</p> <p>Possible sources:</p> <ul style="list-style-type: none"> • FAO/UNESCO Soil Map of the World ²⁷ • Harmonized World Soil Database – FAO ²⁸
10	Harvesting of forest biomass on poor or vulnerable soils	<ul style="list-style-type: none"> • If necessary, according to regional legislation harvesting permission, issued by the relevant competent authority are provided by the supplier. • Otherwise confirmation of compliance with local guidelines or best practice guidelines regarding vulnerable soils through operational reports/harvest protocols are provided (e.g. justification of chosen harvesting system in respect of soil type and slope). • If such guidelines do not exist, 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' proof that a consultation with relevant experts regarding soil vulnerability and possible harvesting systems has been conducted. Operational reports/harvest protocols of these sites specify in any of the above cases measures implemented to minimize impact on soil (e.g. means of reduced impact logging (RIL), soil protecting harvesting system, low tire pressure, residue topping on logging trails, logging when soil is frozen, no redundant driving, permanent logging trails, power shift clutch, skid chains, traction-assisting-winch, etc.). • Must be provided upon every consignment that partially or fully consists of timber originating of such areas.
11	Stump or residue removal	<p>Provision of harvest protocols including information about the site of harvest. Comparison with existing maps of poor or vulnerable soils in the forest sourcing area (item 9) to ensure, that stumps or residues do not origin from sensitive sites.</p> <p>Must be provided upon every consignment of stumps or residues. If stumps or residues are harvested on sensitive sites a permission of the relevant competent authority must be provided by the supplier.</p>

²⁷ <http://www.fao.org/soils-portal/soil-survey/soil-maps-and-databases/faunesco-soil-map-of-the-world/en/>

²⁸ <http://www.fao.org/soils-portal/soil-survey/soil-maps-and-databases/harmonized-world-soil-database-v12/en/>

Item No.:	Indicator	Sources for verification of the indicator
12	Consideration and minimizing of negative impacts on biodiversity features	<ul style="list-style-type: none"> • Management plans or operational reports assess biodiversity and habitat features (e.g. habitat features for rare and endangered species, features and prevalent species with a high biodiversity value etc.), including estimated or measured amounts of deadwood per hectare. • Operational reports/harvest protocols capture and evaluate the impacts of harvesting operations. • Operational reports/harvest protocols created during or after harvest include before-and-after pictures or written descriptions of the impacts on the beforehand identified biodiversity and habitat features. • If there are prevalent recommendations/requirements regarding types and dimensions of deadwood documents of deadwood inventory show compliance with those recommendations/ requirements. <p>Operational reports/harvest protocols including the postulated proof must be provided upon every consignment. In order to minimize impacts of forest management appropriate assessment of impacts and planning to minimize impacts is necessary. Operational reports/harvest protocols could include for example a "checklist" for the assessment of potential impacts as well as an assessment of measures to minimize them at operational level (according to e.g. regional Best Management Practices).</p>
13	Minimization of impacts on soil and remaining stand	<ul style="list-style-type: none"> • Operational reports/harvest protocols created during or after harvest show proof that precautionary measures have been implemented regarding soil protection and include before-and after-pictures or written description of impacts on logging trails and damages on the remaining stand. • Furthermore measures implemented to minimize negative impacts on soil (e.g. means of reduced impact logging (RIL), soil protecting harvesting system, low tire pressure, residue topping on logging trails, logging when soil is frozen, no redundant driving, permanent logging trails, power shift clutch, skid chains, traction-assisting-winch, etc.) are described or depicted in the operational reports/harvest protocols. • Operational reports/harvest protocols confirm that local best practice guidelines or relevant legislation regarding soil protection during harvesting operations are compiled with (i.e. chosen harvesting system is justified in respect of soil type and slope). <p>Operational reports/harvest protocols including the postulated proof must be provided upon every consignment. In order to minimize impacts of forest management appropriate assessment of impacts and planning to minimize impacts is necessary. Operational reports/harvest protocols could include for example a "checklist" for the assessment of potential impacts as well as an assessment of measures to minimize them at operational level. Operational reports/harvest protocols including the postulated proof must be provided upon every consignment.</p>

Figure 7 shows the stepwise approach for demonstrating compliance with criterion **on long-term production capacity**. The stepwise approach bases on two key indicators, firstly that of 'sustainable harvest levels', and secondly that 'average annual harvested timber amounts should normally not exceed net annual increment'. If the latter would however be the case, then evidence and well-argued reasons would need to be provided that would exceptionally justify this. Examples of when this would be justified are restructuring of single-species even-aged to 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 5 presents the checklist for demonstrating compliance with criterion **on long-term production capacity**.

Figure 7. Stepwise for compliance with the long-term production capacity criterion

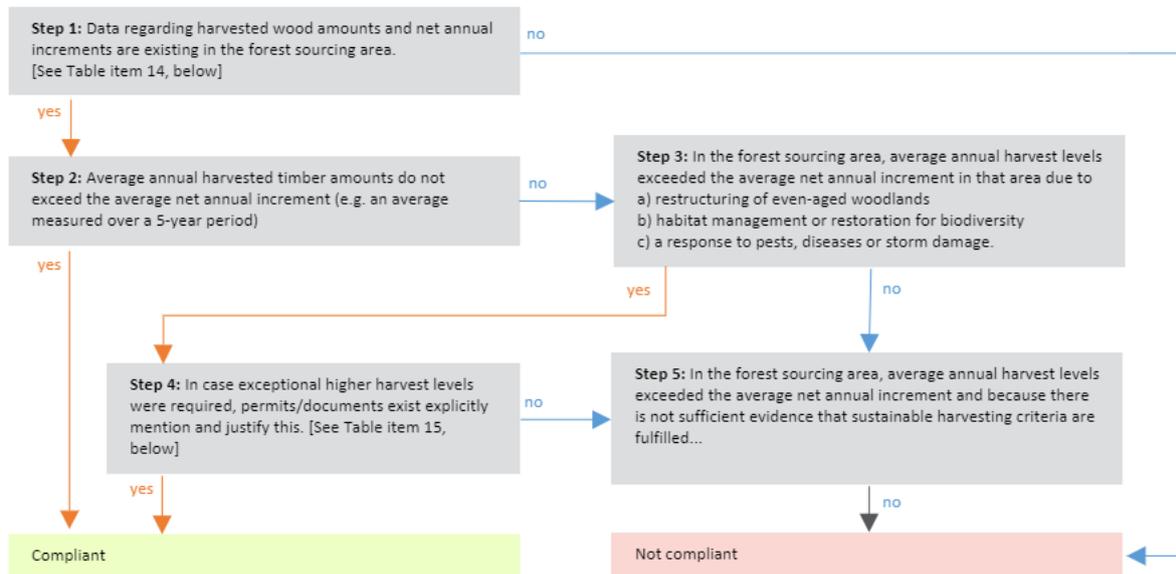


Table 5. Checklist for the long-term production capacity criterion

Item No.:	Indicator	Sources for verification of the indicator
14	Sustainable harvest levels	Harvest levels are justified by inventory and growth data. The relevant competent authority or the first party conducts <i>in situ</i> forest inventories periodically. Detailed harvesting reports are compiled periodically for the forest management unit, region, state and/or country. Data regarding harvested wood amounts and net annual increments are gathered for the forest sourcing area. Evaluation 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.
15	Harvest amounts exceed net annual increments	<ul style="list-style-type: none"> In case exceptional higher harvest levels as a consequence of e.g. natural disturbances occurred, permits or documents exist, explicitly mention and justify this through e.g. reports of the relevant competent forest authority, explaining the reasons for the exceptional high harvest levels in the region the forest sourcing area is a part of. In case of a selective site with higher harvesting levels specific permits issued by the relevant competent authority allow these temporally higher harvest levels.

Implementation challenges

Possible challenges of using the identified tools for showing compliance at level B include:

- 29.6b(ii) - Forest management plans, which would be a basic information requirement for sustainably sourced biomass normally are not required from e.g. small forest owners or other particular forest ownership categories or management systems (e.g. intermitted management). A contractual commitment by the forest owner (the biomass seller) could be an alternative type of evidence. However, as forest management plans are typically followed up by forest authorities, there is more certainty about actual implementation of commitments made in such plan.
- 29.6b(iv) - Soil quality and/or biodiversity may not be monitored by competent authorities or institutions, specifically in the sourcing area. The operator may then need to implement a soil and/or biodiversity inventory, as well as monitoring. This may require third party expertise.

- 29.6b(iv) – The appropriate resolution of such inventories must be determined. The resolution must be sufficiently precise to identify poor and/or vulnerable soils and the relevant biodiversity features in the forest sourcing area, while created at reasonable expense.
- 29.6b(v) - The ratio of fellings over net annual increment is not suitable as an indicator for small forest sourcing areas as due to historic reasons many forests may be in a limited range of age classes. But since the assessment has to take place at the level complete forest sourcing area and not necessarily on the level of each forest management unit, regional available data, showing harvest levels do not exceed increment (e.g. over a 5, or 10 year period) at the forest sourcing area level are considered sufficient evidence.

2.3 Article 29.7: Criteria for Land Use, Land-Use Change and Forestry

2.3.1 Legal text

Article 29.7 requires economic operators to ensure that biofuels, bioliquids and biomass fuels produced from forest biomass meet a number of **land-use, land-use change and forestry (LULUCF) criteria**, as reported in the box below.

Box 2: Legal text of REDII Article 29.7 relating to the LULUCF criteria

Biofuels, bioliquids and biomass fuels produced from forest biomass taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 shall meet the following land-use, land-use change and forestry (LULUCF) criteria:

- (a) The country or regional economic integration organisation of origin of the forest biomass is a Party to the Paris Agreement and;
 - (i) 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
 - (ii) 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;
- (b) Where evidence referred to in point (a) of this paragraph is not available, the biofuels, bioliquids and biomass fuels produced from forest biomass shall be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 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.

2.3.2 Relevant definitions and concepts

This section explains the relevant definitions related to LULUCF in the order as they appear in the legal text. Please note that definitions and concepts already introduced in Section 2.2.2 are not repeated.

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.²⁹

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.³⁰

²⁹ <https://unfccc.int/process-and-meetings/the-convention/glossary-of-climate-change-acronyms-and-terms>

³⁰ European Commission. https://ec.europa.eu/europeaid/sectors/economic-growth/regional-integration_en

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) 2016/1841.³¹ For information on the ratification status as of [10 December 2019], please refer to Appendix F.

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.

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.³²

Emissions

Anthropogenic (i.e. originating from human activity) emissions of greenhouse gases into the atmosphere by sources.³³

Removals

Anthropogenic (originating from human activity) removals of greenhouse gases from the atmosphere by sinks.³⁴

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).³⁵

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

³¹ Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU. Official Journal of the European Union L156/1.

³² UNFCCC website. <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs>

³³ Decision No 529/2013/EU of the European Parliament and of the Council of 21 May 2013 on accounting rules on greenhouse gas emissions and removals resulting from activities relating to land use, land-use change and forestry and on information concerning actions relating to those activities.

³⁴ Decision No 529/2013/EU

³⁵ IPCC 2006: 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 4: Agriculture, Forestry and Other Land Use. <https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html>

frameworks need to be in place to report on carbon emissions and removals by the LULUCF sector. 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.

Carbon stock

The mass of carbon stored in a carbon pool.³⁶ Examples of relevant carbon pools are forest biomass (above- and belowground), deadwood, litter and soil organic carbon.

Carbon sink

Any process, activity or mechanism that removes a greenhouse gas, an aerosol, or a precursor to a greenhouse gas from the atmosphere.³⁷ This refers to the process of storing the carbon. Once the carbon is stored, it becomes part of a carbon stock (see following definition).

Management system

The term 'management system' means an information management system³⁸ 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). The management system shall include all criteria and makes reference to the information sources that are checked to demonstrate compliance. In addition, a decision tree can be used that helps with the assessment of the available information. The management system ensures that information necessary to demonstrate compliance, is collected, verified, assessed and durably stored by the economic operator.

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).³⁹

2.3.3 Stepwise approach for demonstrating compliance with the LULUCF criteria

Figure 8 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 will need to be sought at forest sourcing area level (referred to as "level B"). For guidance on the concept of sourcing area level, please refer to the definition in Section (2.2.2).

Guidance on tools for demonstrating compliance at the different levels is elaborated in the following sections.

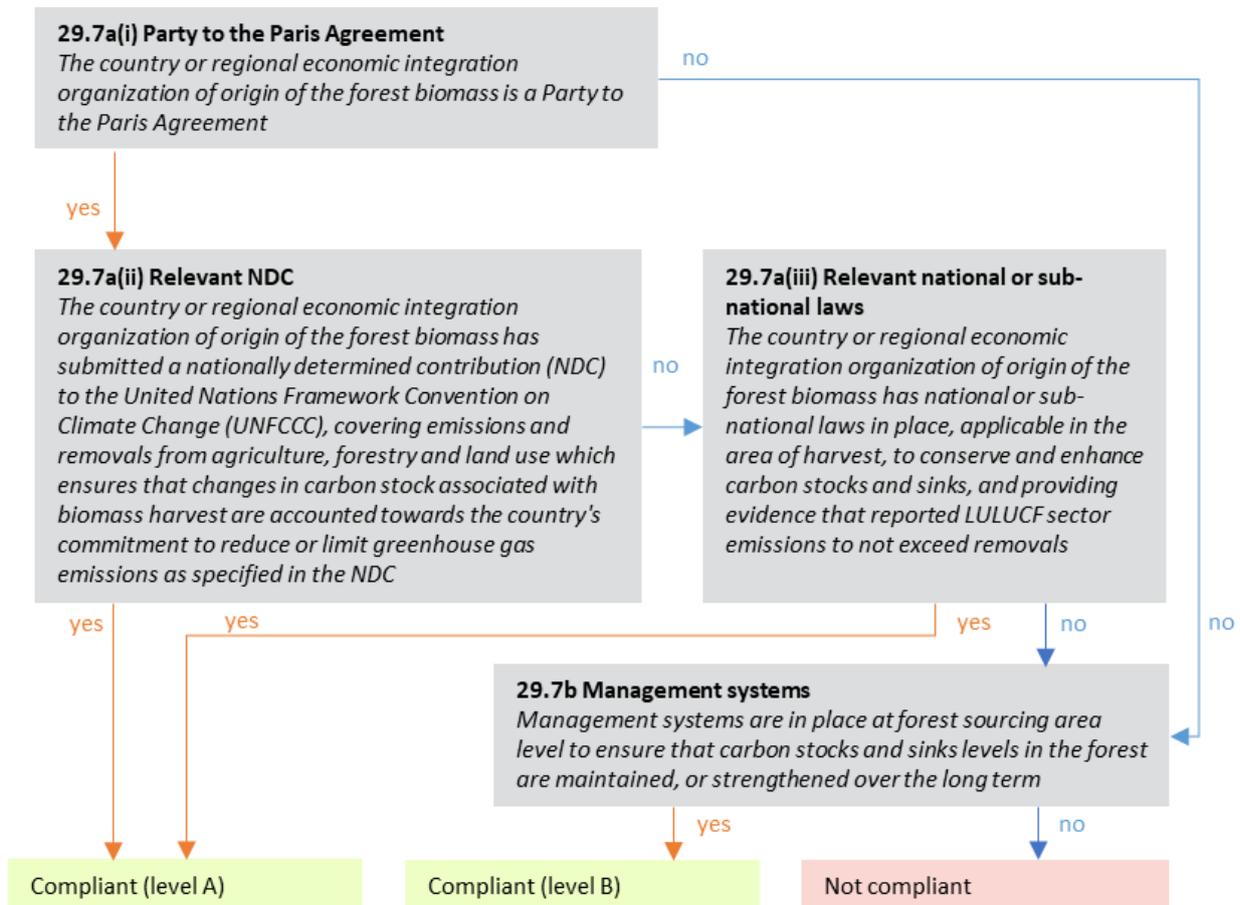
³⁶ Regulation (EU) 2018/841

³⁷ Regulation (EU) 2018/841

³⁸ A management system can consist of a collection of steps.

³⁹ Directive 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast). Official Journal of the European Union L328/82.

Figure 8. Stepwise approach to demonstrate compliance with the LULUCF criteria



2.3.3.1 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 2.3.1), 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 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) (see Section 2.3.3.2).

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 frames⁴⁰. Some countries have already submitted new NDCs and more countries will submit them towards the end of 2020⁴¹.

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 LULUCF 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 even 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
- Include emissions 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 providing 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

⁴⁰ <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs#eq-1>

⁴¹ <https://www4.unfccc.int/sites/ndcstaging/Pages/LatestSubmissions.aspx>

impact of annual disturbance or any eventual stochastic events on the levels of carbon emissions and removals.

Also, it is good practice to consider information from future projections of LULUCF sector emissions and removals to ensure that forests will not become a source of emissions in the foreseeable future under the existing legal framework. 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) (see Section 2.3.3.2).

Table 6. Summary of LULUCF criteria, related proof of compliance and possible sources of evidence (Article 29.7(a))

Criteria	Proof of compliance	Source
The country or regional economic integration organisation of origin of the forest biomass:		
(i) is a Party to the Paris Agreement	<ul style="list-style-type: none"> The country or regional economic integration organisation is listed as a Party to the Paris Agreement 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Presence of a Nationally Determined Contribution in the UNFCCC registry, submitted by the country or regional economic integration organisation 	<ul style="list-style-type: none"> NDC is included in the UNFCCC NDC Registry: https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs
	<ul style="list-style-type: none"> Emissions and removals by agriculture, forestry and land use are included in the country's or regional economic integration organisation's NDC 	<ul style="list-style-type: none"> Information provided in the NDC
	<ul style="list-style-type: none"> Changes in carbon stock associated with biomass harvest are considered as a separate target or integrated into an economywide target in the NDC 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Presence of national or sub-national laws to conserve and enhance carbon stocks and sinks in forests 	<ul style="list-style-type: none"> National or sub-national legislation
	<ul style="list-style-type: none"> Reported LULUCF-sector emissions for the country or regional economic integration organisation do not exceed removals 	<ul style="list-style-type: none"> Compare emissions and removals for the LULUCF sector, as reported in National Inventory Reports submitted to UNFCCC: https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2019

2.3.3.2 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 that management systems are in place to ensure that carbon stocks and sinks levels in the forest are maintained or strengthened, both over the long term. It is recommended that such

systems include planning and periodic monitoring of the development of forests and their carbon stocks and sinks.

An economic operator can provide evidence of compliance with the LULUCF criterion at the level of a sourcing area, by adapting existing methodologies to assess carbon stocks and sinks in forests. These methodologies are used for national level assessments under the LULUCF Regulation (see also supporting documents by Grassi et al. (2018)⁴² and Forsell et al. (2018)⁴³ and Table 7 for an overview of voluntary carbon standards for certifying carbon emissions reductions through AFOLU activities at landscape or stand level).

Voluntary carbon standards may serve as a useful starting point for developing approaches to demonstrate compliance with the LULUCF sub-criterion. However, it should be noted that such voluntary carbon standards are designed to ensure that a carbon project is storing more carbon compared to the baseline development which would take place in the absence of the carbon project (ensuring “additionality”). Compliance with the LULUCF criterion may be confirmed when average stocks and sinks are both maintained the over long term.

Table 7. Overview of selected carbon standards with relevance to REDII

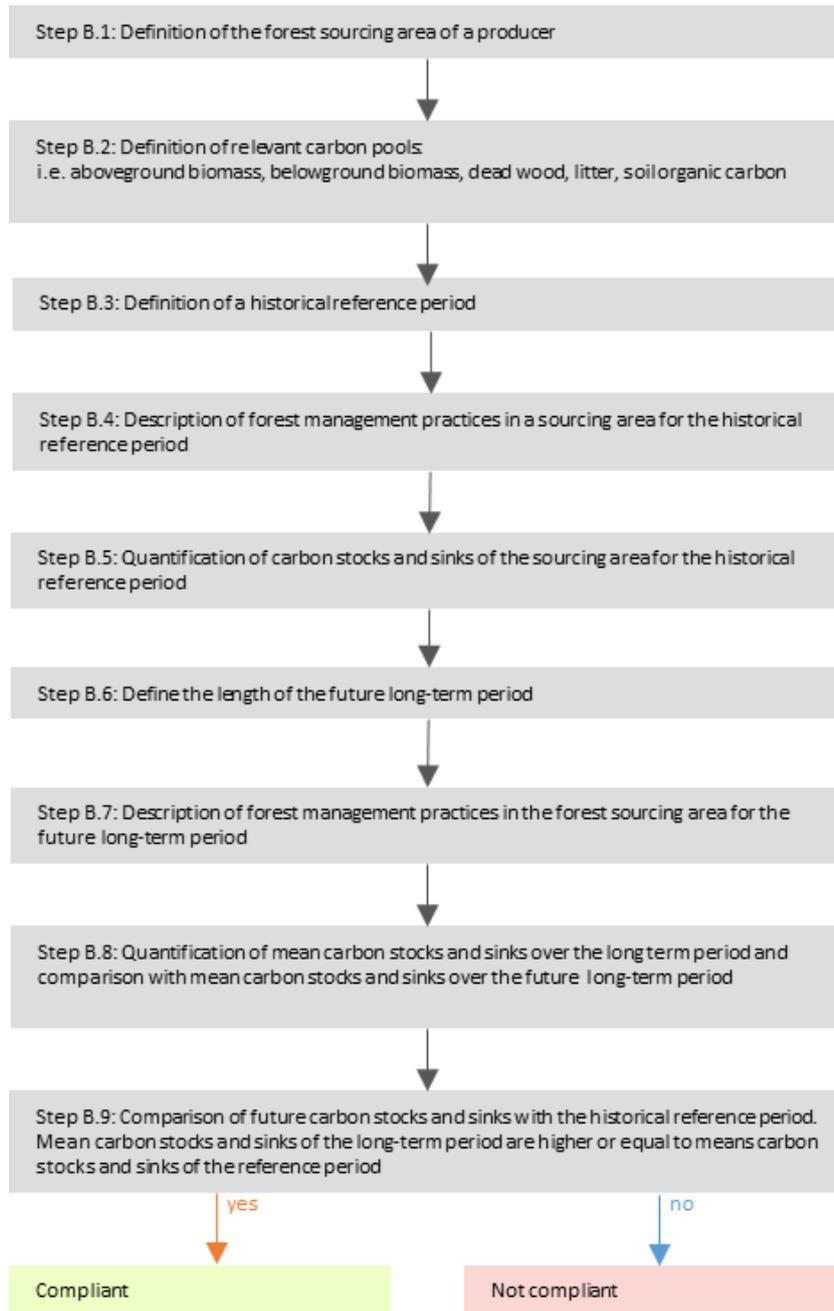
Existing carbon standards	Source
GHG Protocol LULUCF Project Accounting Guidance	https://ghgprotocol.org/sites/default/files/standards_supporting/LULUCF%20Guidance_1.pdf
Verified Carbon Standard	https://verra.org/project/vcs-program/
Climate Community and Biodiversity Standard	http://www.climate-standards.org/
The Gold Standard	https://www.goldstandard.org/
Plan Vivo System	https://www.planvivo.org/docs/Plan-Vivo-Standard.pdf
Carbon Farming Initiative	https://www.agriculture.gov.au/water/policy/carbon-farming-initiative
American Carbon Registry	https://americancarbonregistry.org/

Building on existing methodologies, the following section describes a stepwise approach, including nine steps, 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.

⁴² Grassi, G., Pilli, R., House, J., Federici, S., Kurz, W.A., 2018. Science-based approach for credible accounting of mitigation in managed forests. Carbon Balance and Management 13, 8.

⁴³ Forsell, N., Korosuo, A., Federici, S., Gusti, M., Cristóbal, J.J.R., Rüter, S., Jiménez, B.S., Dore, C., Brajterman, O., Gardiner, J., 2018. Guidance on developing and reporting Forest Reference Levels in accordance with Regulation (EU) 2018/841). European Commission Directorate-General for Climate Action, Brussels.

Figure 9. Steps to demonstrate LULUCF criteria compliance at forest sourcing area level (Article 29.7(b))



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 Section 2.2.2 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. Box 1 provides additional information on the size of a forest sourcing area.

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 compartments. 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 organic carbon

Moreover, such an approach would also encompass all the carbon pools considered relevant by the LULUCF Regulation⁴⁴ 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 Regulation⁴⁵, 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: Describe forest management practices in a sourcing area for a historical reference period

To quantify carbon stocks and sinks of a sourcing area, it is necessary to describe forest management practices employed in the area. It is recommended that an operator describes forest

⁴⁴ EU 2018/841, Annex 1, Section B

⁴⁵ EU 2018/841

management practices (e.g. harvesting and thinning intensity, harvesting levels, age class structure etc.) by collecting data on historical activities from historical management plan(s) or forest inventories.

If management plans or forest inventories are not available, an operator can determine common forest management practices in a sourcing area. The common forest management practices scenario can be selected by considering typical management practices in areas having comparable ecological conditions and forest management goals. It is recommended to identify common forest management practices based on quantifiable, credible and verifiable sources such as: expert feedback of certified regional experts, national forest inventory, harvesting records, historical remote sensing data etc. The identified common forest management practices must at minimum comply with legal requirements that are valid in a sourcing area.

When constructing a common forest management practices scenario, it is recommended to consider the following factors that may affect the development and calculation of forest carbon balances and sinks:

- Annual harvest level
- Site index
- 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
- Conversion factors (e.g. basic wood density, carbon content, factors to convert tree diameter, height and/or growing stock volume to whole-tree biomass)

Potential data sources for these factors are listed in Table 9.

Step B.5: 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 reference values that can be used to estimate if a specific value has been maintained or increased. It is recommended to collect data or estimate mean values for carbon sinks and stocks of the sourcing area during a reference period as reference values for a compliance check.

If possible, existing data on carbon stocks and sinks in the sourcing area should be collected (see Table 9). If there are no existing data, it is recommended that an economic operator estimates mean carbon stocks and sinks of the sourcing area for the historical reference period by applying forest carbon calculators and models (see Table 8) which consider the effects of forest growth (including aging) and management practices. Useful data can be obtained from historical forest management plans or inventories conducted in the sourcing area (see step B.4), but additional data 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 estimates reference values for all the relevant carbon pools. When estimating historical carbon stocks and sinks, it is recommended to further stratify the sourcing area in homogenous units in order 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 organic carbon, see step B.2), it is recommended that a justification is provided why a pool cannot be quantified and why omitting the pool does not affect compliance with the requirement to maintain or strengthen carbon stocks in the long term.

Step B.6: 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. The rationale behind such operationalization of the concept “long-term” is provided in Box 3. Please note that the assessment period is not static and always forward looking. Accordingly, it is recommended that the assessment period covers 30 years after a harvesting event from which biomass is sourced.

Box 3: Methodological considerations for the choice of temporal boundaries of the assessment

REDII requires that the levels of carbon stocks and sinks of a sourcing area are maintained or strengthened, both over the long term. The size of the forest sourcing area is important for defining the choice of the period of time to be considered. In a small forest sourcing area, it can be expected that a long period needs to be considered for demonstrating that carbon stocks and sinks of a sourcing area are maintained or strengthened, while for a larger area a shorter period may suffice. Two main issues influence the methodological decisions of the proposed stepwise approach.

Firstly, according to REDII, Article 29, the sustainability and greenhouse gas emissions saving criteria apply only to installations producing electricity, heating, cooling and fuels with a total rated thermal input equal to or exceeding 20 MW in the case of solid biomass fuels and in the installations with a total rated thermal input equal or exceeding 2MW in the case of gaseous biomass fuels. The forest sourcing areas of such installations are considered to comprise a large area, covering multiple forest stands and age classes. Accordingly, carbon sinks and stocks of such an area can be maintained or strengthened over a time period shorter than an average rotation period of a single forest stand. The forest sourcing area is not necessarily relating to a continuous, unfragmented patch of land, but may comprise several mutually unconnected areas.

Secondly, the temporal boundaries of the compliance check are recommended to be set to a period of at least 30 years, in line with Article 15 of EU regulation 2018/1999. This Regulation requests from member states to submit long-term strategies for greenhouse gas emissions reduction with perspective of at least 30 years. Defining the temporal boundaries as at least 30 years ensures that economic operators (i.e. energy producers) and EU member states are subject to a similar level of stringency.

Step B.7: 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 long-term period (recommended 30 years, see step B.6 and Box 1), an economic operator should describe forest management practices that are reasonably expected to be practiced in the long term. It is recommended to describe if these expected forest management practices deviate from the historical practices and how this may affect the future development of carbon stocks and sinks. A reasonable future forest management scenario may be constructed based on existing forest management plans or other verifiable evidence. The method is alike to the one described in step B.4. The difference is that the estimate in this step is future oriented while the estimates in previous steps were referring to historical forest management practices

Step B.8: Quantify mean carbon stocks and sinks over the future long-term period

It is recommended that an economic operator estimates mean carbon stocks and sinks of a sourcing area for the long term by applying forest carbon calculators and models (for an overview of potential tools, see Table 8), which consider the effects of forest growth (including aging) and management practices. In line with the recommendations provided in step B.5, it is recommended to stratify the sourcing area in homogenous units in order to improve accuracy of the estimates.

Also, to ensure robustness of estimates, it is recommended that the same carbon pools (see step B.2) and same forest carbon calculator or model is employed as for estimating carbon stocks and sinks of a reference level. 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, it is recommended that a justification is provided why a pool cannot be quantified. 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.9: 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 with the carbon stocks and sinks of the reference period. 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 to support the verification of compliance with the sustainability and greenhouse gas emissions saving criteria, under REDII Article 30. These challenges are described in Box 4.

Box 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 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. Monitoring systems are commonly applied by voluntary carbon standards to verify the existence and permanence of carbon credits from AFOLU activities. While mechanisms under the Kyoto Protocol addressed the issue of non-permanence by introducing temporary credits, voluntary carbon schemes use buffers that take into account the potential loss of

carbon stocks. A similar monitoring and verification system can 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 LULUCF Regulation⁴⁶ as well as Forsell et al. (2018)⁴⁷.

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.

⁴⁶ EU 2018/841.

⁴⁷ Forsell, N., Korosuo, A., Federici, S., Gusti, M., Cristóbal, J.J.R., Rüter, S., Jiménez, B.S., Dore, C., Brajterman, O., Gardiner, J., 2018. Guidance on developing and reporting Forest Reference Levels in accordance with Regulation (EU) 2018/841). European Commission Directorate-General for Climate Action, Brussels.

Table 8. Checklist of possible tools to demonstrate LULUCF criteria compliance at forest sourcing area level

Name of tool	Brief description	Reference	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.	<ul style="list-style-type: none"> Masera et al. (2003)⁴⁸ Schelhaas et al. (2004)⁴⁹ 	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).	<ul style="list-style-type: none"> Kull et al. (2016)⁵⁰ Kurz et al. (2009)⁵¹ 	https://www.nrcan.gc.ca/climate-change/impacts-adaptations/climate-change-impacts-forests/carbon-accounting/carbon-budget-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	<ul style="list-style-type: none"> Liski et al. (2005)⁵² 	https://en.ilmatieteenlaito.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)	<ul style="list-style-type: none"> Somogyi (2019)⁵³ 	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.	<ul style="list-style-type: none"> Köhler and Huth (1998)⁵⁴ 	http://formind.org/model/

⁴⁸ Masera OR, Garza-Caligaris JF, Kanninen M, Karjalainen T, Liski J, Nabuurs GJ, et al. Modeling carbon sequestration in afforestation, agroforestry and forest management projects: the CO2FIX V.2 approach. *Ecological Modelling*. 2003;164(2-3):177-99.

⁴⁹ Schelhaas MJ, Esch PWv, Groen TA, Jong BHJd, Kanninen M, Liski J, et al. CO2FIX V 3.1 - Manual. Wageningen: CATIE, EFI, Alterra and Wageningen University; 2004.

⁵⁰ Kull SJ, Rampley G, Morken S, Metsaranta J, Neilson ET, Kurz WA (2016) Operational-scale Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3) version 1.2: user's guide. Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta. 346 p. <http://cfs.nrcan.gc.ca/publications/download-pdf/36556>

⁵¹ Kurz WA, Dymond CC, White TM, Stinson G, Shaw CH, Rampley GJ, Smyth C, Simpson BN, Neilson ET, Trofymow JA, Metsaranta J, Apps MJ (2009) CBM-CFS3: A model of carbon-dynamics in forestry and land-use change implementing IPCC standards. *Ecol. Model.* 220(4): 480-504.

⁵² Liski, J., Palosuo, T., Peltoniemi, M., Sievänen, R. (2005) Carbon and decomposition model Yasso for forest soils. *Ecological Modelling* 189(1):168-182. DOI: 10.1016/j.ecolmodel.2005.03.005.

⁵³ Somogyi, Z. 2019. CASMOFOR version 6.1. NARIC Forest Research Institute, Budapest.

⁵⁴ The effect of tree species grouping in tropical rain forest modelling – Simulation with the individual based model FORMIND. Köhler and Huth, *Ecological Modelling* 1998 Peter Köhler, Andreas Huth. <http://www.sciencedirect.com/science/article/pii/S0304380098000660>

Table 9. Potential data sources to demonstrate LULUCF criteria compliance at forest sourcing area level

Variable affecting carbon stock and sinks in forests	Potential source of information
Tree species composition	<ul style="list-style-type: none"> • Forest management plan
Age structure	<ul style="list-style-type: none"> • Forest management plan
Forest reproductive material used (provenance)	<ul style="list-style-type: none"> • Forest management plan
Growth rate of the selected tree species and forest reproductive material used	<ul style="list-style-type: none"> • National or regional yield tables • Producer of seedlings or seeds used for regeneration
Basic wood density	<ul style="list-style-type: none"> • IPCC 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol
Carbon content	<ul style="list-style-type: none"> • IPCC 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol
Whole-tree biomass in relation growing stock volume	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Forest management plan • Forest management recommendations applicable to the forest sourcing level
Rotation length	<ul style="list-style-type: none"> • Forest management plan • Forest management recommendations • Empirical historic data for the sourcing area on rotation cycles applied
Cutting regime	<ul style="list-style-type: none"> • Forest management plan • Forest management recommendations
Other management decisions	<ul style="list-style-type: none"> • Forest management plan • Forest management recommendations

3 TASK 2 – GUIDANCE ON AGRICULTURAL BIOMASS SUSTAINABILITY CRITERIA

The purpose of Chapter 3 is to provide the following elements: a) technical input for the development of a guidance document to ensure compliance with the sustainability criteria at Article 29.2 and Article 29.3(b) of the REDII; and b) an operational approach to demonstrate compliance with Article 29.2 and Article 29.3(b), including a stepwise approach, specific indicators and the evidence to be provided.

3.1 Introduction

Article 29.2 and 29.3(b) of the REDII require the following:

- **Article 29.2** requires ‘operators or national authorities’ to have monitoring or management plans in place that can address the potential impacts on soil quality and soil carbon from the extraction of waste and residues derived from agricultural land.
- **Article 29.3(b)** states that biofuels, bioliquids and biomass produced from ‘agricultural biomass’ shall not be made from raw material obtained from land which had the status in or after January 2008 of 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.

Article 29(3)b complements the areas identified in the RED from which material cannot be sourced as to count towards renewable energy targets, by adding the category of highly biodiverse forest and other wooded land. The implementation of this criterion will be similar to existing land types that are currently already excluded from feedstock sourcing, with the key exercise in this study to determine clearly what land falls within this category.

Understanding the needs linked to Article 29.2 requires: analysis on the relationship between residual and waste agricultural biomass and soil quality and carbon; and the development of guidance to ensure that monitoring and management plans are put in place to address any potential impacts through the process of residue and waste extraction driven by bioenergy demand. Among the Annex IX list included in the REDII, in discussion with the European Commission, the decision was taken to focus on the feedstocks that can be derived from field harvesting, namely straw, cobs cleaned of kernels of corn and husks. As acknowledged in COM(2019)225 final⁵⁵, while it is recognised that there is not sufficient scientific evidence available to justify an enlargement of the Annex IX feedstock base for advanced biofuels, the Commission will continue to assess whether additional feedstocks could be used for the production of advanced biofuels in the future.⁵⁶ The technical input in relation to the waste and residue criteria provided within this study is intended as primarily applicable to straw, cobs and husks, but potentially extendable to additional feedstocks beyond the current list included in Annex IX of the REDII. Feedstocks that are a result of industrial processes are considered beyond the scope of this study.

The **objective** of the task on agricultural biomass is, therefore, to develop technical input for a guidance document on the implementation of these new sustainability criteria for agriculture biomass, including defining key concepts, identifying potential impacts, reviewing best practices and identifying a checklist to ensure compliance with the criteria.

⁵⁵ Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Renewable Energy Progress Report, 9.4.2019

<https://ec.europa.eu/transparency/regdoc/rep/1/2019/EN/COM-2019-225-F1-EN-MAIN-PART-1.PDF>

⁵⁶ https://ec.europa.eu/commission/sites/beta-political/files/report-progress-renewable-energy-april2019_en.pdf

The **approach** for this Task 2 is as follows. The REDII articles 29.2 and 29.3(b) were developed into a stepwise assessment approach to guide the decision on how compliance for a criterion can be demonstrated. This is to be amended in light of developing further indicators and proofing tools to demonstrate compliance and minimising risks of non-compliance.

To this end, an in-depth desk-based literature review as well as a review of key international and EU pieces of legislation was undertaken. The references and the outcome of the review are presented in Sections 3.2.2 and 3.2.3. The literature review was complemented by expert calls and interaction with stakeholders, relevant to both the waste and residue criteria and the highly biodiverse forest land criteria. At the time of writing this report, stakeholder interaction was as follows:

- Presentation of the preliminary findings of Task 2 at the REDIIBIO stakeholder workshop in Brussels on 11 October 2019. More details on the stakeholder workshop (e.g. attendees) as well as an overview of all stakeholder interaction is presented in Appendix A.
- The German Biomass Research Centre sent two reference papers in relation to the harvesting of agricultural residues in Germany in relation to the criteria specified in Article 29.2 on 18 October 2019.
- 2BSvs sent a reference to the ELBA tool to map agricultural biomass availability in France in relation to the criteria specified in Article 29(2) on 14 October 2019.
- BirdLife International and International Union for Conservation of Nature, as host of the Secretariat of the Key Biodiverse Areas initiative. The listing of Key Biodiverse Areas at global level is currently being considered as possible evidence for Article 29.3(b) on the criteria on Highly biodiverse forest and other wooded land. A call took place on 18 November 2019.
- Presentation of the preliminary findings of Task 2 at the CA-RES conference in Brussels on 28 November 2019. On the day, feedback was received by Member State participants and supported the development of Task 2, e.g. the case study selection.
- Danish Energy Agency to enquire further information in relation the proposed case study related to Article 29(2) on the criteria on waste and residues. For over 25 years Denmark appears to have had a considerable utilisation of straw for energy and biogas production. It is therefore considered of main interest to be explored as a case study (see Section 3.4.2). An email exchange took place on 24 November 2019.
- Contacts have been made with the Institute for the Diversification and Supply of Energy within the Spanish Ministry of Ecological Transition in light of pursuing further the proposed case study on Spain as relates to Article 29.2 (see Section 3.4.2). An email exchange took place on 13 December 2019.
- Contacts have been made with the Italian Energy Services Manager, should a case study on Italy be selected as related to Article 29.2. An email exchange took place on 24 November 2019.
- Contact was made with key research project investigating soil quality and monitoring questions including the H2020 iSQAPER and Circasa teams.

This chapter is **structured** into two main sections. The first section addresses article 29.2 (criteria on wastes and residues) and a second section to address article 29.3(b) (criteria on highly biodiverse forest and other wooded land). Per criteria, we first introduce the legal text, describe relevant concepts and definitions, after which we present the stepwise approach to demonstrate compliance. Finally, we present a list of tools and evidence that can be used to demonstrate compliance.

3.2 Article 29.2 Criteria on Wastes and residues from agricultural land

The increased awareness of the potential impact of using 'conventional' feedstocks (i.e. in the form of food and feed crops) for the production of biofuels has led to an increased focus on the production and promotion of advanced biofuels in the EU, based on the use of agricultural waste and residue feedstocks. Annex IX of the REDII sets out a non-exhaustive list of feedstocks for the production of biogas and advanced biofuels for transport, the contribution of which may be considered twice their energy content against the achievement of a share of final consumption of at least 0.2% in 2022, at least 1% in 2025 and at least 3.5% in 2030 at European level (Article 25.1 first and fourth subparagraph). Biofuels in compliance with rules within Annex IX of the RED II account for almost half of the biofuel share (after double counting). In 2017 this was equal to 2.5% out of 7.2%, of the total estimated share of renewable energy in transport.⁵⁷

3.2.1 Legal text

Article 29.2 specifies sustainability criteria to address the risk that biofuels, bio-liquids and biomass fuels produced from harvesting agricultural waste and residues have impacts on soil quality and soil carbon by requiring that operators or national authorities have monitoring or management plans in place.

Box 5: Legal text of the REDII Article 29.2 relating to wastes and residues

Biofuels, bioliquids and biomass fuels produced from waste and residues derived not from forestry but from agricultural land shall be taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 only where operators or national authorities have monitoring or management plans in place in order to address the impacts on soil quality and soil carbon. Information about how those impacts are monitored and managed shall be reported pursuant to Article 30.3.

3.2.2 Relevant definitions and concepts

Understanding the building blocks of the waste and residue criteria is the starting point. This focuses on the concepts of 'soil quality' and 'soil carbon', as per Article 29.2 of the REDII.

An overview of the relevant definitions used to define technical concepts within the criteria at Article 29.2 is presented below. The review has covered the following EU and international pieces of legislation and initiatives:

- The EU Common Agricultural Policy (2014 – 2020)
 - Regulation (EU) No 1307/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and repealing Council Regulation (EC) No 637/2008 and Council Regulation (EC) No 73/2009.
 - Regulation (EU) No 1307/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and repealing Council Regulation (EC) No 637/2008 and Council Regulation (EC) No 73/2009.
- The EU Soil Thematic Strategy (2006)

⁵⁷ Ecofys (2019) Technical assistance in realisation of the 2018 report on biofuels sustainability.

- Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Thematic Strategy for Soil Protection [SEC(2006)620] [SEC(2006)1165]. COM/2006/0231 final */.
- REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS The implementation of the Soil Thematic Strategy and ongoing activities. COM/2012/046 final */.
- **FAO**
 - Guidelines for Soil Description (2006) URL: <http://www.fao.org/3/a-a0541e.pdf>.
 - The importance of soil organic matter (2005) URL: <http://www.fao.org/3/a0100e/a0100e00.htm#Contents>.
- **IPCC**
 - Special Report on Climate Change and Land (2019) URL: <https://www.ipcc.ch/report/srccl/>.

The review of EU and international legislation and initiatives has resulted in a limited number of definitions that suits the purpose of this study, as reported below.

Soil carbon, as referred to in the RED II text can be considered to represent soil organic carbon content (the amount of carbon stored in the soil), which is commonly used as an indicator of soil organic matter content. Soil organic matter consists of a range of material from intact tissue of plants and animals to the decomposed mixture of materials known as humus⁵⁸. Organic matter is an important component of soil because it influences inter alia soil structure, stability, water and nutrient retention, soil biodiversity and plant nutrition. A decline in organic matter is accompanied by a decline in fertility and loss of structure, which together exacerbate overall soil degradation.

With regard to the concept of soil quality, no suitable definition has been found in either EU nor international legislation and initiatives screened so far. Concepts are more normally linked to soil threats reduction or the preservation of soil function/ecosystem services. It is, therefore proposed, to give consideration to the definition and related indicators monitored by Eurostat available in the JRC publication 'Agri-environmental Soil Quality Indicator in the European perspective'.⁵⁹ Within this 'soil quality' is defined as 'the soil's ability to provide ecosystem and social services through its capacities to perform its functions under changing conditions'.

Within the academic literature soil quality is commonly defined in line with definitions from Doran and Parkin (1994) which states that soil quality is "the capacity of a soil to function within ecosystem and land-use boundaries to sustain biological productivity, maintain environmental quality, and promote plant and animal health"⁶⁰.

Agricultural soils themselves are multifaceted and heterogeneous, the product of natural processes combined with the land management practices to which they are exposed⁶¹. Variation in the soil itself is driven by both the natural processes that generated the soil and the land use and management regimes to which it has been subject. As noted by Bouma and Droogers (2007) the challenge of classification of soils is at the heart of determining correct management and policy interventions. Soils can't be regulated based solely on the natural characteristics, nor can you do so based purely on the land management intervention.

⁵⁸ FAO (2005) The importance of soil organic matter. URL: <http://www.fao.org/3/a0100e/a0100e00.htm#Contents>

⁵⁹ JRC (2010) Agri-environmental soil quality indicator in the European Union. URL: <https://publications.jrc.ec.europa.eu/repository/handle/JRC57594>

⁶⁰ Doran, J.W. and Parkin, T.B. (1994) Defining and Assessing Soil Quality. In: Doran, J.W., Coleman, D.C., Bezdicek, D.F. and Stewart, B.A., Eds., Defining Soil Quality for a Sustainable Environment, Soil Science Society of America Journal, Madison, 3-21. Definitions as used as baselines in recent H2020 projects on soil quality such as iSQAPER and linked published papers.

⁶¹ Bowyer, Keenleyside, Nanni, Hoffmann, van Haren, van Boxtel, Wolvekamp (2018) Interactive Soil Quality Assessment in Europe and China for Agricultural Productivity and Environmental Resilience.

Regulation has to deal the interaction between the two to promote transition to soil quality in the multiple different settings that exist. Given the variability and the need for targeted solutions a number of tiered approaches to delivering policy change are set out in relevant literature. The most effective mechanisms for delivering improved land management involve: the careful analysis of land conditions; an understanding of what are the best management techniques for a given area; and the integrated planning of land management decisions at the local level (JRC, 2008).

3.2.3 Impacts & land management practices

Compliance with the waste and residue criteria requires an understanding of what constitutes an impact on soil carbon and soil quality, what the impacts relate to and how they can be mitigated through the use of (best available) land management practices. This section explores preliminary findings of identified impacts and management practice approaches to mitigate such impacts related to the implementation of the sustainability criteria on wastes and residues at Article 29.2 of the REDII.

3.2.3.1 Review of existing work on impacts

Within this section we provide a brief review of existing studies and other information sources that identify impacts on soils with a focus on waste and residual biomass from agricultural land. This may include waste and residual biomass more generally as well.

The review covered literature from EU and third country-based studies focusing on the potential impacts linked to additional harvesting of agricultural residues for bioenergy production. The full list of studies reviewed can be found in Appendix H. In line with REDII the analysis focuses on impacts related to soil quality and soil (organic) carbon.

It is worth noting that most of the reviewed scientific studies and literature present impacts from harvesting cereal straw, while fewer focus on cobs and husks extraction. Such lack of data and information on cobs and husks is partly explained by the nature of the agricultural sector in Europe which is dominated by cereal production. Currently, cereal straw has a variety of existing and marketable uses, whereas cobs and husks have more limited markets and are not utilised to the same extent for bioenergy production. Therefore, information on the latter is more limited. In order to test potential impacts, a case study focused on cob harvesting is performed (See Appendix D).

3.2.3.2 Identifying impacts

This section describes in brief the potential impacts that can arise from harvesting the identified residues from agricultural land. These are set out in detail in Table 10 and a summary of potential impacts identified from the review are:

- Possible consequences of residue removal include higher risk of erosion by water and wind, decreased water retention capacity, loss of soil nutrients, loss of soil fertility, reduction in soil and surface humidity, change in soil temperature, structure, mineralization, soil biota, and pH, and direct and indirect emissions due to the reduction or loss of soil organic matter.
- The degree of impacts on soil organic carbon are not universally agreed upon, with evidence highlighting different outcomes as to speed, magnitude and degree of effect on particular soil types, especially for very fertile soils. Nonetheless, there is a known risk associated with residue removal in relation to loss of soil organic matter over time, the extent of which will depend on existing soil condition and alternative practices on farm employed to support SOC content.
- Some areas in Europe may benefit from straw removal. For example, in parts of Southern and Eastern Europe there is a risk of loss of soil fertility from over incorporation of straw into soil which affects the balance of carbon to nitrogen (C:N ratio). This is particularly apparent in areas where soil conditions do not allow straw to decompose quickly (e.g. arid land). This is

specifically linked to the relationship between nitrogen demand and the decomposition of organic matter.

- In general terms, the potential impacts identified are locally- and site-specific. General conclusions can be drawn to a limited extent. Within this study, consideration will be given to the most appropriate level at which interventions should take place to ensure compliance with the REDII criteria.

Table 10. Selected potential impacts of harvesting agricultural residues on soil quality and soil carbon

Feedstock	Impacts on soil quality	Impacts on soil carbon	Considerations / Mitigation practices
Straw (cereal-based)	Loss of soil organic carbon. Loss varies according to straw harvest rates, type of crop, harvesting practices, climate conditions	Direct emissions due to the loss of soil organic carbon driven by straw removal	Local assessments are suggested to be undertaken to determine the acceptable and sustainable rate of straw removal. It is however advisable not to remove straw every year as this is likely to lead to deterioration in soil physical properties. Actions relating to crop production may include: 1) reducing, minimising or zero tillage systems; and 2) reducing levels of bare earth and enhancing crop cover. For instance, grass is seen as more effective at storing carbon than straw. As a consequence, if the crop is rotated regularly with grass, it may be possible to remove higher shares of straw from agricultural land. The type of mechanical equipment used for harvesting may also have an influence on the soil organic carbon.
	Increased soil erosion from both water and wind linked to straw removal	Indirect emissions generated by diverting straw for existing uses	In relation to soil erosion, if straw on the soil surface, rather than incorporated, it acts as a surface mulch.
	Decreased water retention capacity due to straw removal	-	Straw cover can reduce evaporation from the soil surface, thereby conserving moisture.
	Loss of soil nutrients due to straw removal	-	In order to maintain soil nutrients, management practices involving use of increased crop residue incorporation and the use of manure in a targeted way to replace man-made fertilisers are recommended. In addition, approaches to better understand and manage nutrients on farms, such as nutrient management plans, are advised to be put in place. Additional 40 kg K ₂ O per hectare is applied to the soil if cereal straw is removed to compensate for the nutrient loss (compared to when straw is incorporated). The value of incorporating straw as a fertiliser source will vary on a site by site basis depending upon the soil type and fertiliser prices.
Cobs	-	Limited to very limited loss of soil organic carbon linked to cob removal	The amount of nitrogen (and some other nutrients) that is removed in cob harvest will most likely be offset by the fact that cobs have such a high carbon to nitrogen ratio. In continuous corn production the need for nitrogen in soil regeneration might actually be reduced because of the removal of carbon rich cobs that tends to tie up nitrogen. A prerequisite would be that all other residue material (stalks, leaves and chaff) remains on the field. In Europe, cobs are normally harvested with the corn.
Husks	Loss of soil fertility	Direct emissions as a consequence of loss of soil	In temperate and boreal regions, organic matter retains organic carbon for longer if residues are left to decompose slowly instead of being used for energy.

Feedstock	Impacts on soil quality	Impacts on soil carbon	Considerations / Mitigation practices
		organic carbon driven by harvesting	Densification and storage technologies would enable cost-effective collections over larger areas. Site-specific land use considerations need to be taken into account to mitigate fluxes of soil organic carbon stocks.
	-	Indirect emissions generated by diverting agricultural residues to energy and resulting alternative practices	-

Box 6. Distinction between theoretical, technical, environmental and sustainable potential in harvesting crop residues⁶²

Crop residue potentials are generally measured in terms of theoretical potential, technical potential, environmental potential and sustainable potential. Theoretical potential refers to the total residue production of above ground biomass without taking into consideration any harvesting, environmental and/or economic constraints; technical potential refers to the total residue production of above ground biomass without taking into consideration any harvesting, environmental and/or economic constraints. It takes into account crop type, type of equipment used, field management practices among others. Environmental potential refers to the physical amount of materials that could be removed from the field without causing major adverse impacts on land. Sustainable potential refers to the physical amount of materials that could be removed from the field considering technical constraints for harvesting and collecting, and environmental effects as well.

3.2.3.1 Review of existing work on management practices to minimise soil quality and soil carbon impacts

Based iteratively on the previous section, this activity aims to identify existing management practices able to address or mitigate the potential impacts of residue extraction on soil quality and soil carbon. A literature review was conducted on the sustainability standards of a selection of voluntary certification schemes (Better Biomass, Bonsucro, ISCC, RSB and RTRS) and other initiatives (GBEP, RTFO Meta-standard) that address soil quality (see Appendix G). These schemes and initiatives require, or encourage, maintaining or improving soil quality and soil carbon and not only provide best soil management practices, but also specific criteria for soil and indicators to measure compliance with these criteria.

This is important for the operationalisation of soil sustainability criteria; compared to academic or other types of literature that only address soil management in a theoretical manner, schemes and initiatives can provide insight on best practices that can be measured, monitored, and enforced in a straightforward manner. These soil criteria are not all exclusive to wastes and residues but still address the soil impacts identified in the previous section. Although the schemes and initiatives highly vary in the breadth of soil quality aspects they cover, they collectively provide a good overview of practices to sustainably harvest biomass without negatively affecting soil quality and carbon.

This process develops upon existing guidance at international and EU Member State level, which recognise the importance of maintaining and improving quality and carbon levels of soils.

⁶² Based on Scarlat et al. (2019), Integrated and spatially explicit assessment of sustainable crop residues potential in Europe, Biomass and Bioenergy, Volume 122, Pages 257-269. URL: <http://www.sciencedirect.com/science/article/pii/S0961953419300303>

A review of the following guidance documentation has been undertaken:

- Rural Development Service (UK), Producing a Soil Management Plan for Environmental Stewardship. <http://adlib.everysite.co.uk/resources/000/107/821/soil-management-plan.pdf>
- Defra (UK) Protecting our Water, Soil and Air. A code of Good Agricultural Practice for farmers, growers and land managers. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/268691/pb13558-cogap-131223.pdf
- FAO, Voluntary Guidelines for Sustainable Soil Management. <http://www.fao.org/3/a-bl813e.pdf>
- Roundtable of Sustainable Biomaterials, Soil Impact Assessment Guidelines.
- USDA, Soil Health Assessment. <https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/assessment/>
- EU Technical Expert Group on Sustainable Finance; Taxonomy report Annex – contains details on management intended to manage GHG emissions from agriculture including soils - https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy-annexes_en.pdf

3.2.3.2 Identifying relevant monitoring and management practices

A non-exhaustive list of the best practices was identified from the literature review, as shown in Table 11. Table 12 sets out a list of monitoring techniques or tools that can be used to demonstrate/monitor effective management. It should be noted that these best practices are not exclusive and do overlap, i.e. soil management plans as a best practice can include other best practices such as the planting of cover crops.

Maintenance of soil quality and soil carbon depends on a wide number of factors linked to the local conditions of the site. These include **specific site conditions** (soil type, soil fertility, soil organic matter content level soil moisture, topography and slope, risk of erosion), **climate conditions** (wind and precipitation patterns), historical and existing **land management** (crop rotation, tillage practices and fertilisation), as well as **animal husbandry practices** on farm.⁶³

The level of harvesting and/or incorporation of agricultural residues (such as straw) from, and on, the fields is an important factor influencing soil quality and carbon retention capacity at a local level, although not the only one, as detailed in Table 11.

Of the literature reviewed, only a small sub-set provide recommended agricultural residue removal rates to ensure maintenance of soil quality and carbon retention capacity (see Appendix J). The removal rates presented are seen to vary across a wide range, however comparability between the studies is made challenging by the different baselines and assumptions applied.

⁶³ Ecofys (2013) Low ILUC potential of wastes and residues for biofuels. Straw, forestry residues, UCO, corn cobs. URL: http://www.mvak.eu/test5674213467/Ecofys_2013_low_ILUC.pdf

Table 11. Soil management best practices for soil quality and carbon mitigation impacts

Best practice	Mitigation impact
Low or no-till	Improves soil function, soil organic matter, compaction, aggregates, and other important aspects of soil quality
Cover crops	Cover crops can reduce wind erosion
Conservation agriculture practices	Includes practices such as direct seeding or soil cover (mulch or cover crops) that maintain or improve soil quality, or the inclusion of manure or digestate (as a result of biogas production). Care needs to be taken to manage the amount of manure used to avoid negative consequences.
Soil management plan	A soil management plan outlines the strategies and is a preventative rather than reactive measure.
Crop rotation or intercropping	Can maintain and improve soil fertility and soil structure.

Table 12. Soil management best practices for soil quality and carbon mitigation impacts

Monitoring approach	Demonstrating
Risk assessment	Identifying areas with high risk of soil quality decline helps to prevent these risks and to focus on areas with the greatest impact.
Soil organic matter (SOM) analysis	Consistent sampling of soil organic matter improves monitoring so that soil organic matter can be maintained or improved.
Soil organic carbon (SOC) analysis	Soil organic carbon is seen as a good marker for wider soil quality.
Soil Conditioning Index (SCI) sampling	A positive SCI value indicates the system is predicted to have increasing soil organic matter.
Soil erosion assessment	Ensures that erosion is below a tolerable level i.e. USDA ARS 't' levels.
Nutrient management plan	A plan outlining nutrient strategy (focusing mostly on N, P, K) and fertiliser regimes can prevent nutrient imbalances.
Regular soil pH analysis	Monitoring pH helps to flag imbalances in pH.

3.2.4 Demonstrating compliance

Based on the literature review⁶⁴ and consideration of available data it became evident that a global or national default value designed to set a limit on residue extraction (either general or differentiated by soil type or crop) would not be an effective evidence-based solution at present. Specifically, it was concluded that there are significant data gaps in terms of (i) appropriate levels of residue retention (in particular for non-cereal crops) and how this might be differentiated per country, region or globally and of (ii) consistent, detailed, spatial data on soil quality.

Any compliance approach should place the burden of proof on the economic operator seeking to place the biomass, biofuels, or biogas on the market, rather than on the individual farmer. The logical choice would be the collection facility level (also termed first gathering point⁶⁵), which is where primary producers feed into energy production supply chains. This would be intended to avoid all farmers being obliged to assess and validate their residue extraction. Such an approach is more akin to

⁶⁵ The first gathering point could be defined as a collection hub for residues collected off-farm.

approaches applied to forest biomass and other waste and residue collection⁶⁶ and should enable group certification approaches to be utilised effectively.

Based on the literature review it was concluded that alternative management practices i.e. alternative to residue retention, can support soil quality and soil carbon protection when residues are removed. Therefore, it is proposed that a list of 'essential soil management practices' be put in place. The implementation of these management practices is deemed to protect soil quality and soil carbon on farm. In line with the REDII text their implementation should be monitored in order to demonstrate compliance with the Article 29.2. Evidence of monitoring and management practices can be demonstrated either through rules set out in national legislation or, if not available, at the first gathering point (sourcing area level).

This approach builds upon the rules set out in the recent EU Sustainable Finance Taxonomy (Technical Annex, March 2020)⁶⁷ whereby a list of essential practices is set out for non-perennial crops which are deemed (in combination) to build soil carbon.

The selected essential soil management practices required to demonstrate compliance with Article 29.2 are presented in Table 13. These practices do not represent separate choices as alternatives to residue management but should be integrated as a whole to ensure that soil quality and soil carbon are promote post residue removal and use for energy.

While the detail of soil management practices to address potential impacts on soil quality and soil carbon may vary between countries and regions, the list in Table 13 have been selected given that they are considered both in relevant EU documents and in the wider literature to promote soil quality and soil carbon (see Table 11). While there are other techniques that can promote soil carbon quality (beyond those listed in Table 13), for example organic matter addition, these are not available to all farmers. In the case of organic matter addition, since this could have potential impacts on water quality parameters and there are limits to additions by other regulatory tools for water protection, this is not included as a technique available to all. The techniques listed below are those considered to be available for all farmers with low risk of harm to other environmental parameters.

⁶⁶ In these cases, collection points require points of origin to provide a self-declaration and a sample of points of origin are checked by auditors.

⁶⁷ Please refer to Annex I for further information on the EU Sustainable Finance Taxonomy initiative.

Table 13. Proposed ‘essential soil management practices’ known to promote soil carbon sequestration (given the absence of residues) and promote soil quality⁶⁸

Requirement	Soil quality parameter
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1.	Promoting soil fertility, soil carbon, limiting of soil erosion, soil biodiversity and promoting pathogen control
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	Promoting soil fertility, soil carbon retention, avoidance of erosion, soil biodiversity
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	Retention of soil structure, avoiding soil erosion, retaining soil biodiversity
No burning of arable stubble except where authority has granted an exemption for plant health reasons⁶⁹.	Soil carbon retention, resource efficiency
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity.	Improved soil structure, soil biodiversity, soil carbon

The following section describes the options for the assessment of whether agricultural residues were sourced from areas where operators or national authorities have monitoring or management plans in place in order to address the impacts on soil quality and soil carbon. There are two levels at which compliance can be demonstrated:

- Tier 1 – The application of ‘essential soil management practices’ on all farms where agricultural residues are collected is required in the country of origin of feedstock supply, and that the implementation of these practises is monitored and enforced;

Or – if this is not the case in the country of origin,
- Tier 2 – It must be demonstrated that ‘essential soil management practices’ are in place on the farms from which the agricultural residues are collected.

More detail on these two levels of evidence demonstration is presented below. Please note that for each management practice, either Tier 1 or Tier 2 evidence can be provided (thus it is not necessary to provide the same Tier of evidence for all the required management practices).

Additionally, if evidence can be provided to demonstrate that other soil and soil carbon management practices are being employed on farm alongside evidence that soil carbon and soil quality are being monitored and maintained on farm despite residue removal, this would be considered an alternative set of proofs at Tier 2.

Tier 1 – Determine if the country of origin (Member State or third country) of agricultural residues requires the application of essential soil management practices that aim to address the potential impacts of harvesting such residues on soil quality and soil carbon and has in place mechanisms to monitor and enforce implementation of these practices.

It is required to check whether a country of origin of agricultural residues has established the essential soil management practices set out in Table 13. Evidence of establishment of such land management

⁶⁸ It should be noted that the following list of practices applies non perennial crops, an equivalent list could be developed for perennial crops using the same methodological approach and building on the Sustainable Taxonomy Annex provisions for perennial crops.

⁶⁹ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392.

practices must be accompanied by evidence that their implementation on land where residues are collected for energy purposes is monitored and enforced.

Evidence of compliance would be determined through identification of relevant national laws and policies, for example through existing agriculture policy frameworks in the country of origin. For example, under the future CAP a Member State may have obligations in place that require such practices, under conditionality rules, under a dedicated eco-scheme/equivalent scheme. Were these put in place these could be used as proofs, where applied, for the establishment of essential soil management practices addressing the impacts of harvesting agricultural residues on soil quality and soil carbon; where the farmer supplying the residues is subject to the rules. There are of course exceptions as the CAP remains a voluntary support mechanism and thus it is not compulsory for farmers to receive support, and thus be bound by conditionality requirements of the policy. However, in the EU these would be rare cases.

If this condition is not met, demonstrating compliance at national level (Tier 1) is not possible and an economic operator should proceed with demonstrating compliance in relation to the individual farm holdings that are supplying biomass.

Tier 2 – Essential soil management practices must be demonstrated (monitored/seen to be implemented) to be in place on the farm holdings supplying the biomass.

Farms where agricultural residues are sold for energy must demonstrate that crops are being produced in line with the essential soil management practices set out in Table 8. Alternatively, if evidence can be provided to demonstrate that other soil and soil carbon management practices are being employed on farm alongside evidence that soil carbon and soil quality are being monitored and maintained on farm despite residue removal, this would be considered an alternative set of proofs at Tier 2. Importantly use of this clause should be accompanied by evidence (held by the operator and subject to audit as relevant) setting out the alternative soil management practices being employed on land and how these mitigate soil threats from residue removal.

In case any of the essential management practices are not relevant for specific farm or region (e.g. the essential management practice regarding acidic soils), evidence should be provided (and verified) to demonstrate that the practice is not relevant for that specific region/farm.

The burden of proof to demonstrate compliance with Article 29.2 is placed on the entity acting as first gathering point (specifically gathering points trading with/supplying material to energy end users), or the economic operator that is in receipt of supplied residues.

This reduces the burden on the individual supplying farm to provide evidence of compliance, although each farm would nonetheless be required to have in place the management practices.

The first gathering point or economic operator is required to collect self-declarations provided by the producers supplying the agricultural residues as proof of compliance. The declarations would be sent by each farm to the first gathering point annually in a standard format. The self-declarations should contain, as a minimum, the following information:

- Type of farm
- Type of crops grown
- An assessment (monitoring document) setting out how the essential soil management practice(s) these are implemented on farm (given they need to be implemented in specific areas or in relation to specific issues and conditions)
- That they will retain evidence of essential soil management practice compliance for five years

The first gathering point/economic operator is required to have in place an internal management system to check that the supplying farms are in compliance with the above-mentioned requirements.⁷⁰ A fundamental component of such a system is an internal monitoring process, including implications for non-compliance of farms.

Compliance of the sourcing area around the gathering point will be checked by an independent third-party auditor. They will review the documentation provided by farms to the first gathering point and check for evidence that farms exist, that inputs and outputs of residual material tally (and apply rules for waste and residue management).

In addition, they will specifically check a subset of farms providing self-declarations to examine evidence of compliance on farm. The minimum audit intensity shall be the square root of the number of farms supplying the first gathering point. It is expected that audits are undertaken on-site (i.e. that auditors visit the individual farms where the residues are produced).

3.2.5 Tools for demonstrating compliance

Table 14 provides a summary of the tools to demonstrate compliance with the REDII criteria at Article 29.2, for each Tier included in the compliance approach.

⁷⁰ For example, see: https://www.iscc-system.org/wp-content/uploads/2017/02/ISCC_204_Audit_Requirements_and_Risk_Management_3.0.pdf and https://www.iscc-system.org/wp-content/uploads/2017/02/ISCC_206_Group_Certification_3.0.pdf

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Table 14. Tools for demonstrating compliance

Tiers	Requirement	Evidence	Management	Monitoring
Tier 1	<p>The country of origin of agricultural residues requires the application of essential soil management practices that aim to address the potential impacts of harvesting such residues on soil quality and soil carbon.</p> <p>This meets the requirements of Art. 29.2. of the REDII as follows:</p> <ul style="list-style-type: none"> The country mandates the list of essential soil management practices to mitigate the impacts of residue harvesting on soil quality and soil carbon as part of wider legislation to manage agricultural land; It requires monitoring of the application of rules set out to provide evidence that essential soil management practices are in place. 	<p>Legal requirement for the essential soil management practices to be put in place and monitoring to demonstrate that practices are being put in place.</p>	<p>A Member State potentially as part of its obligations under the future Common Agricultural Policy (CAP) may require that essential management practices are applied.</p> <p>For Third countries where there are schemes or mandated requirements to implement the list of essential management practices on farms.</p>	<p>For rules on crop rotation and cover crops, remote sensing tools should be able to provide evidence of evolutions in crop cover and crop patterns. If this is not available aerial photographs or on-site surveys will need to be relied on based on some form of systematic monitoring methodology. In the case of onsite surveys these would need to review a sample of farms and farm records for crop rotation evidence/infield photographic evidence. For bare soils a transect based methodology assessing the proportion of bare soil in a given area could be applied.</p> <p>For burning of arable stubble, there would need to be a mechanism of compliance to ensure stubble is not burnt and a mechanism to monitor infringements.</p> <p>Monitoring to assess types and level of agricultural residue use in the energy sector.</p>

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Tiers	Requirement	Evidence	Management	Monitoring
Tier 2	<p>The entity acting as first gathering point or economic operator can demonstrate that the agricultural residues used to fulfil the requirements of Article 29.2 are harvested from within sourcing areas or on farms where essential soil management practices are in place and have in place monitoring systems to demonstrate compliance⁷¹.</p> <p>This meets the requirements of Art. 29.2 of the REDII as follows:</p> <ul style="list-style-type: none"> It requires the first gathering point/economic operator to demonstrate that agricultural residues are sourced from areas/holdings where essential management practices are put in place to mitigate the impacts of residue harvesting on soil quality and soil carbon; It requires third party verification of residue suppliers' reporting on the implementation of essential management practices on a sample of farms; It requires monitoring of compliance along the chain of custody 	<p>The first gathering point/economic operator is required to demonstrate that residues used are produced on farms that comply with the essential soil management practices. To do so there are a number of possible routes:</p> <ul style="list-style-type: none"> For all farms supplying residues a self-declaration is provided by the producers annually setting out compliance with the essential soil management practices, this is accompanied by a management system in place that can record sourcing and compliance of residues from the different suppliers (details on material, volume, date of acceptance; data recording on overall residue inputs and residue use/further sale). A sourcing area approach ie a form of group certification could be undertaken based on mapping compliance in the local area using remote sensing and other resources and demonstrating that all residues are sourced from farms that meeting the essential management practice requirements. Management system rules above would still apply 	<p>On farm management of soils in line with the essential soil management practices set out in Table 8⁷²</p> <p>Management systems in place at the gathering point to ensure effective compliance systems</p>	<p>Independent third-party auditor to verify the self-declarations and audit on farm records to ensure there is evidence of compliance. Evidence could include remote sensing, aerial photographs, on farm images of cropping patterns, evidence of purchase of seed e.g. for legume crops, cover crops, photographic evidence infield of crops in situ, infield assessment of bare soil proportions accompanied by photographic evidence.</p> <p>Monitoring at gathering point level of types of residues being processed and passed to energy users, proportions of residues being passed down energy supply chains, mapped extent and coverage of their sourcing area/farms, collated date on farm type and crop types covered</p>

⁷¹ Alternatively, evidence can be provided that an essential soil management practice is not relevant for that farm, or evidence can be provided that other soil and soil carbon management practices are being employed on farm alongside evidence that soil carbon and soil quality are being monitored and maintained on that farm.

⁷² It should be noted that some farms may already have in place evidence demonstrating compliance. However, for others they may not have systematically evidenced these provisions. In such cases a list of evidence needs to demonstrate compliance should be set out. With compliance checked after year 3 to allow farmers to no necessarily have to demonstrate retrospective compliance with provisions (in particular proofs on crop rotation). From year 1 onwards a farmer could be required to take photographic evidence of infield cropping to demonstrate rotation, alongside retention of farm records indicating seed purchases and any relevant equipment purchases/rental/management contracts linked to in field sowing. Photographic evidence could also be used to demonstrate the presence of cover crops, intermediary crops and catch crops and bare soil during key periods in the yearly cycle.

3.3 Article 29.3(b) Criteria on Highly biodiverse forest and other wooded land

The purpose of the following section is two-fold. Firstly, to explain the concept of 'highly biodiverse forest and other wooded land' and secondly to develop a methodology to demonstrate that biomass has not been extracted from land with the status of highly biodiverse forest and other wooded land or that the production of raw material did not interfere with nature protection purposes.

3.3.1 Legal text

Article 29.3 (b) is an additional element added in REDII, the other elements were already in the criteria as introduced in RED.

Within the REDII, land with a high biodiversity value is defined as 'highly biodiverse forest and other wooded land' as per Article 29.3(b). More specifically, the Article defines that biofuels, bioliquids and biomass fuels produced from agricultural biomass shall not be made from raw material obtained from land with a high biodiversity value.

By definition, highly biodiverse forest and other wooded land is 'species-rich and not degraded, or has been identified as being highly biodiverse by the relevant competent authority'. Biofuels, bioliquids and biomass fuels shall not be made from raw material obtained from highly biodiverse forest and other wooded land, 'unless evidence is provided that the production of that raw material did not interfere with those nature protection purposes.'

Box 7: Legal text of the REDII Article 29.3 relating to highly biodiverse forest and other wooded land

Biofuels, bioliquids and biomass fuels produced from agricultural biomass taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 shall not be made from raw material obtained from 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) 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;*
- (c) areas designated:*
 - (i) by law or by the relevant competent authority for nature protection purposes;*
 - (ii) (ii) for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements or included in lists drawn up by intergovernmental organisations or the International Union for the Conservation of Nature, subject to their recognition in accordance with the first subparagraph of Article 30.4,*

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

(d) highly biodiverse grassland spanning more than one hectare that is:

- (i) natural, namely grassland that would remain grassland in the absence of human intervention and that maintains the natural species composition and ecological characteristics and processes;*
- (ii) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and that is species-rich and not degraded and has been identified as being highly biodiverse by the relevant competent authority, unless evidence is provided that the harvesting of the raw material is necessary to preserve its status as highly biodiverse grassland.*

3.3.2 Relevant definitions and concepts

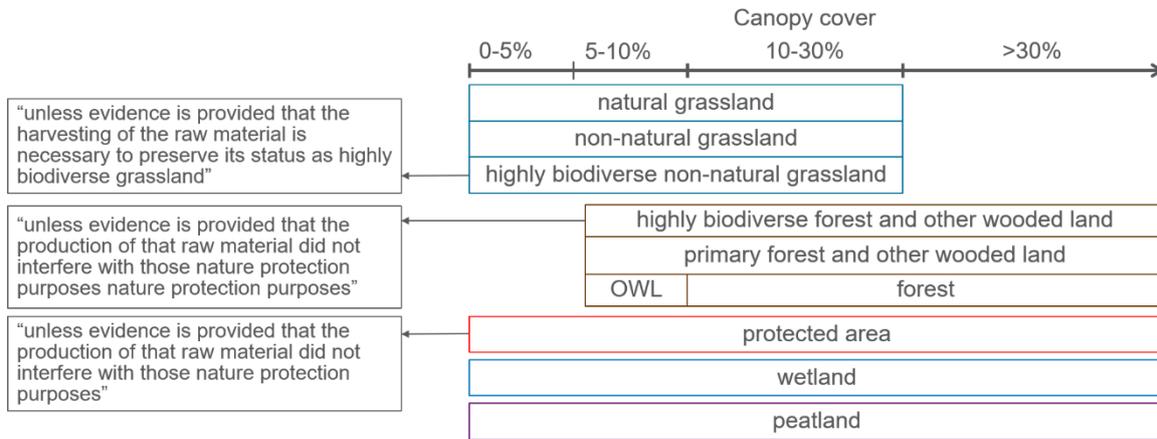
The first step is to explain the concept of highly biodiversity forest and other wooded land in the context of the REDII sustainability criteria. It is important that the concept for forest that is highly biodiverse forest remains congruent with the overall definition of forest, in order to avoid confusion and reduce burden for operators responsible to implement compliance verification.

The REDII specifies that biofuels, bioliquids and biomass fuels produced from agricultural shall not be made from raw material obtained from 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:

- 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 (Article 29.3 of the REDII). This does not include other types of forest as defined by the FAO, such as modified natural forests, semi natural forests and plantations (Preamble §97 of the REDII).
- 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 (ref. REDII Article 29.3(b)).
- [forest] Areas designated: (i) by law or by the relevant competent authority for nature protection purposes; or (ii) for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements or included in lists drawn up by intergovernmental organisations or the International Union for the Conservation of Nature, subject to their recognition in accordance with the first subparagraph of Article 30.4, unless evidence is provided that the production of that raw material did not interfere with those nature protection purposes (ref. REDII Article 29.3(c)).

It is important to point out an overlap exists between on the one hand the definition for highly biodiverse forest and on the other hand the definition for highly biodiverse grassland as regulated by Commission Regulation (EU) 1307/2014. This is illustrated with the following figure (Figure 10) showing that one area can belong to several land categories. This stresses the need to show compliance according to each single criterion listed in REDII Article 29.

Figure 10. Overlap in definitions: possible confusion concerning origin of woody biomass from forest or non-forest origin. The canopy cover separation threshold between other wooded land (OWL) and forest is shown here according the FAO definition



The following table shows further definitions of importance in context of highly biodiverse forest assessment.

Table 15. Definitions and specifications for terms used in the context of highly biodiverse forest (Article 29.3)

Terms	Definitions and Specifications
Agroforestry	Agroforestry systems which include land-use systems where trees are managed together with crops or animal production systems in agricultural settings. ⁷³
Area size	Both grassland (Art. 29.3(d)) and forest (Art. 29.4b+c) shall only be recognised under RED II when spanning more than 1 ha. This definition is also applied to primary forest and other wooded land (Art. 29.3(a)) and highly biodiverse forest and other wooded land (Art. 29.3a), since these area categories are either forest or grassland or both (see Figure 10).
Degraded	A state characterised by long-term loss of biodiversity due to for instance overgrazing, mechanical damage to the vegetation, soil erosion or loss of soil quality. ⁷⁴
Forest	(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; (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. ⁷⁵ Continuously forested area does not include land that is predominantly under agricultural or urban land use. 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. [EC 2010]

⁷³ Commission Regulation (EU) 1307/2014 Art. 1

⁷⁴ Commission Regulation (EU) 1307/2014 Art. 2.4 b

⁷⁵ REDII Art. 29.4

Terms	Definitions and Specifications
Grassland	'Grassland' means terrestrial ecosystems dominated by herbaceous or shrub vegetation for at least 5 years continuously. It includes meadows or pasture that is cropped for hay but excludes land cultivated for other crop production and cropland lying temporarily fallow. It further excludes continuously forested areas as defined in Article 17.4(b) of Directive 2009/28/EC 'canopy cover of more than 30 %, or trees able to reach those thresholds in situ' unless these are agroforestry systems which include land-use systems where trees are managed together with crops or animal production systems in agricultural settings. The dominance of herbaceous or shrub vegetation means that their combined ground cover is larger than the canopy cover of trees. ⁷⁶
Highly biodiverse grassland	Highly biodiverse grassland spanning more than one hectare that is: <ul style="list-style-type: none"> i. Natural, namely grassland that would remain grassland in the absence of human intervention and that maintains the natural species composition and ecological characteristics and processes; or ii. Non-natural, namely grassland that would cease to be grassland in the absence of human intervention and that is species-rich and not degraded and has been identified as being highly biodiverse by the relevant competent authority, unless evidence is provided that the harvesting of the raw material is necessary to preserve its status as highly biodiverse grassland.⁷⁷
Land with temporary fallow	Land that is not seeded for one or more growing seasons. The maximum idle period is usually less than five years. This land may be in the form sown for the exclusive production of green manure. Land remaining fallow for too long may acquire characteristics requiring it to be reclassified, as for instance "Permanent meadows and pastures" if used for grazing or haying. ⁷⁸
Other wooded land (OWL)	Land not classified as "Forest", spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds in situ; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use. ⁷⁹
Primary forest and OWL	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. The definition is in accordance with the definition used by the Food and Agriculture Organisation of the United Nations (FAO) in its Global Forest Resource Assessment. ⁸⁰ Some key characteristics of primary forests are: they show natural forest dynamics, such as natural tree species composition, occurrence of dead wood, natural age structure and natural regeneration processes; the area is large enough to maintain its natural ecological processes; there has been no known significant human intervention or the last significant human intervention was long enough ago to have allowed the natural species composition and processes to have become re-established. ⁸¹

⁷⁶ Commission Regulation (EU) 1307/2014 Art. 1.

⁷⁷ Directive 2018/2001 Art. 29.3 d.

⁷⁸ FAOSTAT item code 6640.

⁷⁹ FAO, 2018. Terms and Definitions. Global Forest Resource Assessment 2020. Forest Resources Assessment Working Paper 188. Food and Agriculture Organization of the United Nations, Rome, 2018. URL on 20191003: <http://www.fao.org/forest-resources-assessment/en/>

⁸⁰ Directive 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast). Official Journal of the European Union L328/82; art.29§3(a).

⁸¹ FAO, 2018. Terms and Definitions. Global Forest Resource Assessment 2020. Forest Resources Assessment Working Paper 188. Food and Agriculture Organization of the United Nations, Rome, 2018. URL on 20191003: <http://www.fao.org/forest-resources-assessment/en/>

Terms	Definitions and Specifications
Species rich	<ul style="list-style-type: none"> i. A habitat of significant importance to critically endangered, endangered or vulnerable species as classified by the International Union for the Conservation of Nature Red List of Threatened Species or other lists with a similar purpose for species or habitats laid down in national legislation or recognised by a competent national authority in the country of origin of the raw material; or ii. A habitat of significant importance to endemic or restricted-range species; or iii. A habitat of significant importance to intra-species genetic diversity; or iv. A habitat of significant importance to globally significant concentrations of migratory species or congregatory species; or v. A regionally or nationally significant or highly threatened or unique ecosystem.⁸²

3.3.3 Demonstrating compliance – Stepwise approach

To ensure compliance with the highly biodiverse forest and other wooded land criteria, operators are required to provide evidence that the biofuels, bioliquids and biomass fuels produced from agricultural biomass are not produced from raw materials from land with high biodiversity value in or after January 2008, as per Article 29.3(b) of the REDII.

The following decision trees guide the assessment of whether agricultural biomass was sourced from an area that is addressed with the Article on highly biodiverse forest and other wooded land. When the conclusion is that the area is not forest or other wooded land or that the forest or other wooded land is not highly biodiverse, then no further proof is needed according to Article 29.3(b). When the area of forest or other wooded land is highly biodiverse, proof is needed that the production of that raw material did not interfere with the intended nature protection purposes. Based on the hierarchical methodology for highly biodiverse grasslands in the European standard EN 16214-3:2012+A1:2017, the following three decision trees are required:

1. Identifying whether a harvesting area has been forest or other wooded land in or after 2008 (decision tree A in Figure 11 and Table 16).
2. Determining whether a harvesting area has been highly biodiverse forest or other wooded land in or after 2008 (decision tree B in Figure 12 and Table 16).
3. Showing evidence that that the production of raw material did not interfere with the protection of the high biodiversity value of highly biodiverse forests and other wooded land (decision tree C in Figure 13 and Table 16).

Note: Irrespective of ensuring that biomass does not come from highly biodiverse forests, the other sustainability requirements must also be examined, i.e. on primary forests (Art. 29.3(a)), protection areas (Art. 29.3(c)), highly biodiverse grassland (Art. 29.3a), wetlands and forests (Art. 29.4) and peatland (Art. 29.5).

Note: Within the stepwise approach ‘no’ means no or no information available, and ‘yes’ means yes.

Note: If an operator can, e.g., provide a proof that the production of raw material did not interfere with nature protection purposes, he can assume without any prove that the area is highly biodiverse forest or other wooded land and start directly with decision tree C.

Decision tree A: Identifying forest and other wooded land

The decision tree A (Figure 11) offers to the economic operator in the first step (A.1) the possibility to show that the cropped area was 100% cropland or other land under agricultural use since 2008. This covers annual and permanent crops (see forest definition in Table 15). Also land that is lying fallow for less than five years can be regarded as cropland and other land under agricultural use, even if the

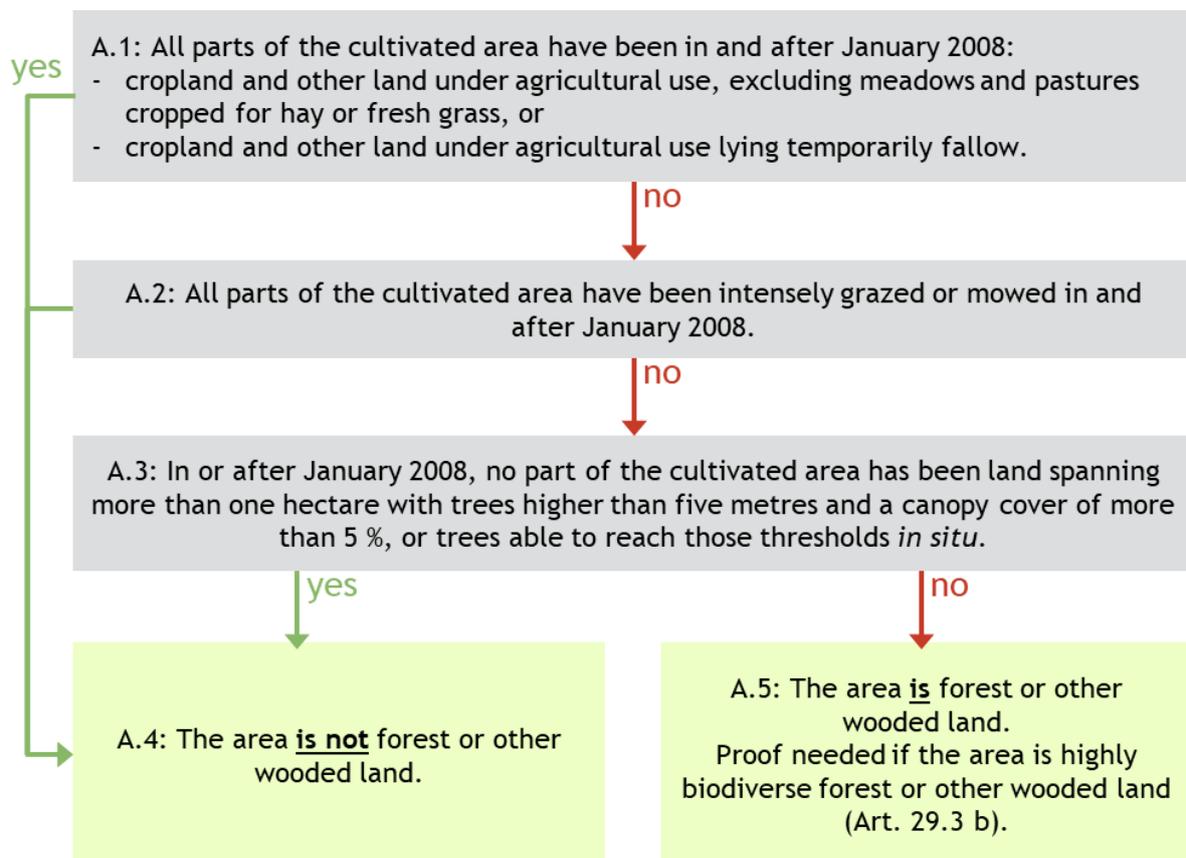
⁸² Commission Regulation (EU) 1307/2014 Art. 12.4 c.

physical condition of the area fulfils e.g. forest criteria. Grasslands such as meadows and pastures, which can show a tree cover of up to 30%, are not considered in this category. This first step in decision tree A ensures that the area was not forest or other wooded land, and no further proof on highly biodiverse forest and other wooded land is needed. The proof must be repeated at least every 5 years. Proofs can be derived from data from field checks⁸³, remote sensing material with high spatial resolution, management plans of the economic operation unit, or information from stakeholders.

If the operator cannot show that the area was arable land or other land under agricultural use (A.1) he can provide evidence in step A.2 that all parts of the area have been intensely grazed or mowed. It can be assumed that intensely grazed or mowed forest and other wooded land rarely show a high biodiversity value. The prove must be repeated at least every 2 years. Needed data can be derived from management plans of the economic operation unit, or information from stakeholders. Meadows with less than four cuts each year and pastures with a mean annual animal density of less than 1 cattle unit per ha and year shall not be considered as intensely grazed or mowed areas. These threshold values may be adopted to regional conditions on the bases of scientific evidence provided by a literature review carried out by an independent third party.⁸⁴

If the operator cannot show that the area was intensely used meadow or pasture (A2) he can provide evidence in step A3 that that no part of the area was forest or other wooded land. This is the case when since 2008 no part of the cultivated area was land spanning more than one hectare with trees higher than five meters and a canopy cover of more than 5%, or trees able to reach those thresholds *in situ*. Proofs shall come from a time series of field check on tree cover or vegetation structure, or from a field check that is not older than five years in combination with remote sensing material with high spatial resolution for former time periods. The proof must be repeated at least every five years.

Figure 11. Decision tree to identify forest and other wooded land (Article 29.3(b))



⁸³ The design of field checks must be suitable for a reliable evaluation of the area under consideration and must be adapted to local conditions.

⁸⁴ In case that both grazing and mowing takes place on the same area within one year, an independent third party shall derive combined threshold values (e.g. 0.75 cattle units per ha and year and less than 2 cut).

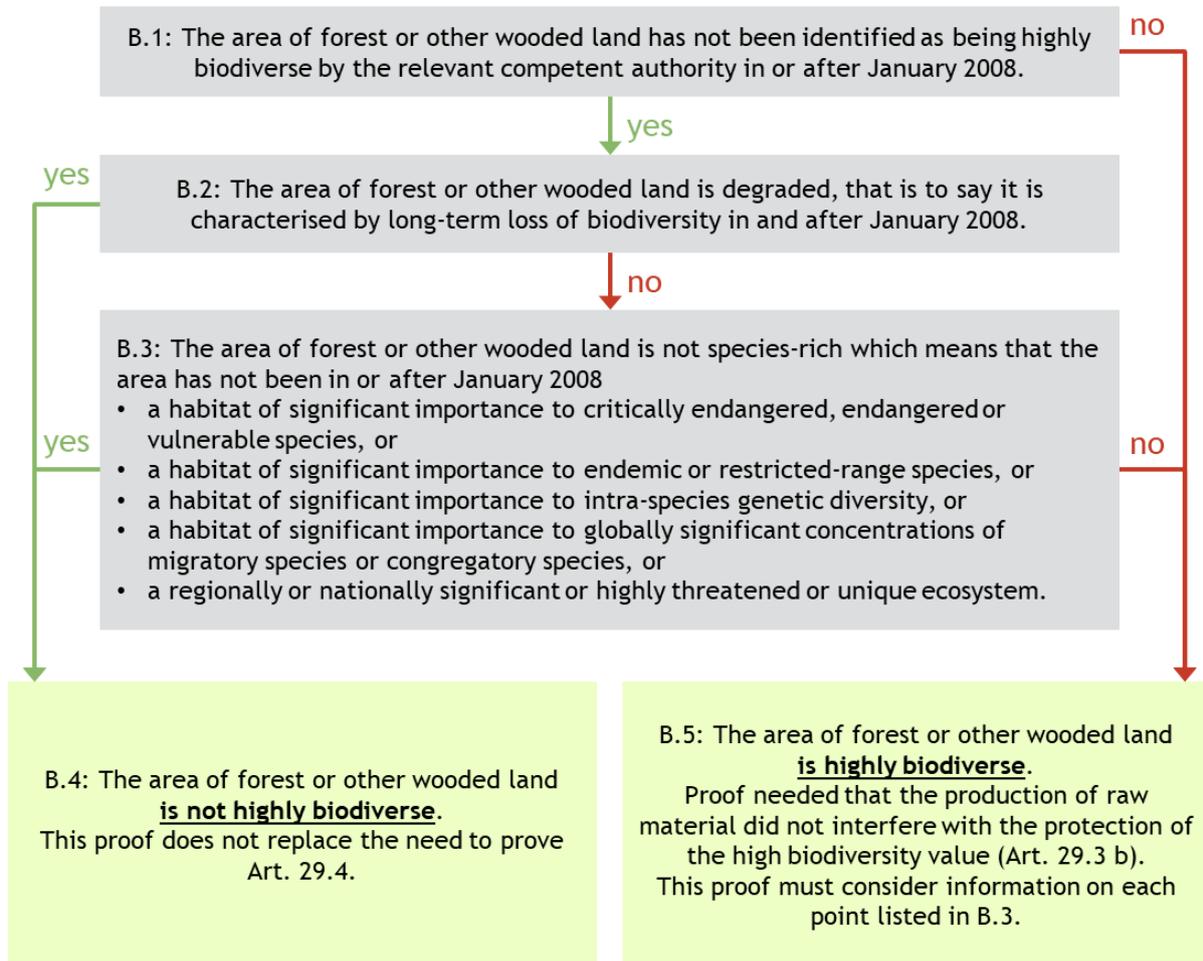
Decision tree B: Determining highly biodiverse forests and other wooded land

The decision tree B (Figure 12) aims at determining the biodiversity status of an area that is forest or other wooded land. In step B.2, the operator shall prove if no part of the production area has been identified by a relevant competent authority as being highly biodiverse. Competent authorities can act on international, national or sub-national level. For a proof, the operator shall compile a list of the competent authorities relevant in the region of cultivation, which is confirmed by an independent third party. For each competent authority a written confirmation is required that the area is not identified as being highly biodiverse. Alternatively, a list of an area-wide mapping of areas with high biodiversity value within the region of cultivation published by the competent authority can be of use for the verification. The proof must cover the time period from 2008 until the date of harvest.

In the second step (B.2) the operator may provide a proof by an independent third party that the forest or other wooded land was not part of a restauration programme and that it is degraded, that is to say it is characterized by long-term loss of biodiversity due to, e.g., overexploitation, mechanical damage to the vegetation, soil erosion or loss of soil quality. The proof shall be based on data from field checks or a combination of data from a field check and remote sensing data (see Table 16). The proof must cover a trend from 2008 until the date of harvest.

In case that the operator cannot show that the area of forest and other wooded land is degraded, he has to prove in a third step that the area is not species rich. Again, an independent third party shall carry out the proof providing evidence that none of the five indicators specifying species richness (see B.3, Figure 12) is fulfilled. This expert evidence shall be based on a time series of field checks of the area or on data from a field check not older than five years in combination with information from published research on such trends at comparable sites in the cultivation region. The proof must cover a trend from 2008 until the date of harvest.

Figure 12. Decision tree to determine highly biodiverse forests and other wooded land (Art. 29.3b)

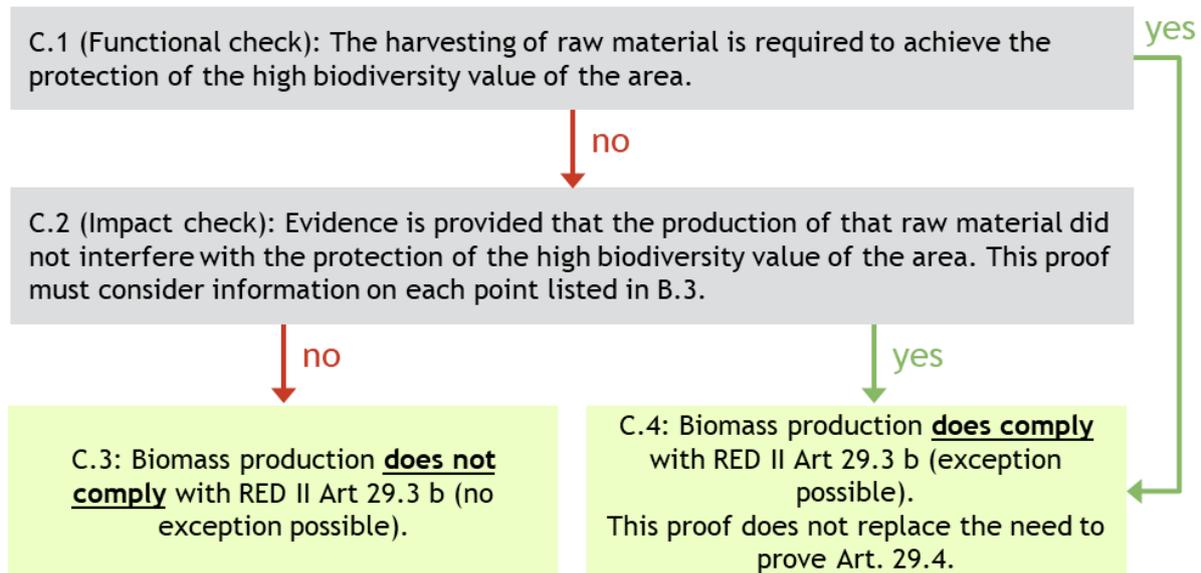


Decision tree C: Exception for highly biodiverse forests and other wooded land

If the operator cannot show in decision tree B that the area of forest or other wooded land is not species rich, he has to provide evidence via decision tree C that the production of raw material did not interfere with nature protection purposes (C.1; Figure 13). With the so-called functional check, the operator may provide a proof carried out by an independent third party that biomass harvest is necessary to maintain or improve species composition and habitat/ecosystem structure of the highly biodiverse area. The proof shall be based on data from field checks (species composition, habitat structure) not older than five years, taking into account information from distribution maps of endangered or vulnerable species, threatened ecosystems, etc. as well as information from best practice examples applied to comparable highly biodiverse areas.

In case that a functional check is not possible, the operator requires a proof by an independent third party that has proven that species composition and habitat/ecosystem structure of the highly biodiverse area is maintained or improved even when agricultural biomass is harvested. The proof shall be based on data from field check not older than five years in combination with a trend analysis on species composition and habitat structure from field check since 2008 (at least every five years) or by published research from comparable sites under comparable managements. Also, management documents of the site since 2008 shall be considered in the proof (at least every five years).

Figure 13. Decision tree to provide evidence that the production of raw material did not interfere with the protection of the high biodiversity value of highly biodiverse forests and other wooded land (Article 29.3(b))



3.3.4 Tools for demonstrating compliance

The tools used to demonstrate compliance with the REDII criteria on highly biodiverse forest land can vary greatly depending on a range of factors. For instance, the type of governance structure set up in the country of origin of the biomass, e.g. whether it is a regionalised country, and therefore which authority would be competent for providing evidence and ensuring compliance with the criteria. In addition, the existence of data and information sources, such as remote sensing, vary across countries, especially beyond the EU borders.

This section will include a list of tools to demonstrate compliance with the REDII criteria on highly biodiverse forest land.

Table 16. Possible tools and evidence to demonstrate compliance (Article 29.3(b))

Step	Proof / tools	Required repetition
Identifying forest and other wooded land (Art. 29.3b)		
A.1	<p>Cropland or other land under agricultural use</p> <ul style="list-style-type: none"> Field checks, or Remote sensing material with high spatial resolution, or Management plans of the economic operation unit, or Management plans of public administration for the operation unit. 	At least every five years
A.2	<p>Intensely mowed and grazed areas</p> <ul style="list-style-type: none"> Management plans of the economic operation unit, or Management plans of public administration for the operation unit Information from stakeholders 	At least every two years
A.3	<p>Forest or other wooded land</p> <ul style="list-style-type: none"> Field check on tree cover or vegetation structure, or Field check not older than five years in combination with remote sensing material with high spatial resolution for former time periods. 	At least every five years
Determining highly biodiverse forests and other wooded land (Art. 29.3b)		
B.1	<p>Competent authority</p> <p>The operator provides a proof that the area has not been identified as being highly biodiverse by</p> <ul style="list-style-type: none"> An internationally relevant competent authority (e.g. IUCN). A nationally relevant competent authority (e.g. national environmental ministry, national nature protection agency). A sub-nationally relevant competent authority (e.g. nature protection agency of the administrative district). <p>The operator compiles a list of the relevant competent authorities, which is confirmed by an independent third party. As proof a written confirmation of the competent authority is required. If the competent authority has published an area-wide mapping of areas with high biodiversity value within the region of cultivation as a list, this list can be used for the verification.</p>	At any moment in time since 2008
B.2	<p>Degraded</p> <p>An independent third party has proven that the area is not part of a restauration programme and that the area is characterised by a long-term loss of biodiversity since 2008 by means of</p> <ul style="list-style-type: none"> Field check not older than five years, and Trends shown by data on species composition and habitat structure from field check since 2008 (at least every five years) or by remote sensing data with high spatial resolution in comparison to non-degraded areas of the same forest or woodland type. 	At any moment in time since 2008
B.3	<p>Species-rich</p> <p>An independent third party has proven that none of the five indicators specifying species richness is fulfilled. This expert evidence shall be based on:</p> <ul style="list-style-type: none"> Field check not older than five years, and Trends shown by data on species composition and habitat structure from field check since 2008 (at least every five years) or from published research on such trends at comparable sites in the cultivation region. 	At any moment in time since 2008
Exception for highly biodiverse forests and other wooded land (Article 29.3(b))		
C.1	<p>Functional check</p> <p>An independent third party has proven that biomass harvest is necessary to maintain or improve species composition and habitat/ecosystem structure of the highly biodiverse area. The proof is based on data from field checks (species composition, habitat structure; not older than five years) taking into account information from distribution maps of endangered or vulnerable species, threatened ecosystems, etc. as well as information from best practice examples applied to comparable highly biodiverse areas.</p>	Not older than five years

Step	Proof / tools	Required repetition
C.2 Impact check	<p>An independent third party has proven that species composition and habitat/ecosystem structure of the highly biodiverse area is maintained or improved even when agricultural biomass is harvested. The proof shall be based on:</p> <ul style="list-style-type: none"> • Field check not older than five years, and • Trends shown by data on species composition and habitat structure from field check since 2008 (at least every five years) or by published research from comparable sites under comparable managements, and • Management documents of the site since 2008 (at least every five years). 	Not older than five years, taking into account information since 2008

4 CHAIN OF CUSTODY AND MASS BALANCE

4.1 Introduction

Member States are responsible for the implementation of the new sustainability criteria mentioned above. They will require economic operators to demonstrate compliance with the sustainability and greenhouse gas saving criteria for all biofuels, bioliquids and biomass fuels consumed and counting towards the targets. The two options for economic operators to demonstrate compliance are using voluntary schemes recognised by the Commission, or providing the relevant Member State authority with data/evidence under a nationally defined system. The evidence to be provided by economic operators should be reliable and third-party audited.

Voluntary schemes (also known as certification schemes) provide independent assurance (through a certificate mechanism) that certain minimum requirements are being fulfilled. Voluntary schemes are one of the main methods currently used by economic operators to demonstrate compliance with the sustainability criteria for biofuels and bioliquids. There are currently 14 biofuel and bioliquid voluntary schemes recognised by the European Commission.⁸⁵ Post-2020 the Commission may additionally recognise voluntary schemes for biomass fuels in heat and power.

The method by which a connection is made between information or claims concerning raw materials or intermediate products and claims concerning final products is known as the **'chain of custody'**. For the purpose of demonstrating compliance with the sustainability requirements, economic operators are required to use a **'mass balance'** chain of custody system (Article 30 of REDII). The chain of custody normally includes all the stages from the feedstock origin up to the obligated economic operator (i.e. the energy generator). The use of the mass balance system ensures that any biomass/biogas or biofuel is counted only once towards the renewable energy targets. Crucially, a mass balance system allows consignments of material with differing sustainability and greenhouse gas emissions saving characteristics to be physically mixed in the supply chain. Consignments of material with differing energy contents can also be mixed for the purposes of further processing, provided that the size of consignments is adjusted according to their energy content.

This chapter gives further details of what a mass balance system means in practice and how it should operate.

The approach for this task is as follows:

- Starting from the legal text as presented in the REDII and using the mass balance guidelines as implemented for biofuels and bioliquids as background
- Review relevant schemes and systems providing information on guidelines they set for mass balance and chain of custody
- Consultation with a selection of stakeholders
- Draft guidelines and calculation examples

⁸⁵ Full list of EC approved voluntary schemes for biofuels and bioliquids: <https://ec.europa.eu/energy/en/topics/renewable-energy/biofuels/voluntary-schemes>

4.2 Legal text, relevant concepts and definitions

Article 30.1 of the REDII includes several updates to the existing mass balance system requirements (covered under Article 18.1 of the RED), which are highlighted in bold text below:

- a) Allows consignments of raw material or fuels with differing sustainability **and greenhouse gas emissions saving** characteristics to be mixed **for instance in a container, processing or logistical facility, transmission and distribution infrastructure or site**;
- b) **Allows consignments of raw material with differing energy content to be mixed for the purposes of further processing, provided that the size of consignments is adjusted according to their energy content**;
- c) Requires information about the sustainability **and greenhouse gas emissions saving** characteristics and sizes of the consignments referred to in point (a) to remain assigned to the mixture; and
- d) Provides for the sum of all consignments withdrawn from the mixture to be described as having the same sustainability characteristics, in the same quantities, as the sum of all consignments added to the mixture **and requires that this balance be achieved over an appropriate period of time**.

Article 30.2 furthermore clarifies how information on the sustainability and greenhouse gas emissions saving characteristics of the consignment shall be adjusted and assigned to the output when consignments are processed.

- a) **When the processing of a consignment of raw material yields only one output that is intended for the production of biofuels, bioliquids or biomass fuels, renewable liquid and gaseous transport fuels of non-biological origin, or recycled carbon fuels, the size of the consignment and the related quantities of sustainability and greenhouse gas emissions saving characteristics shall be adjusted applying a conversion factor representing the ratio between the mass of the output that is intended for such production and the mass of the raw material entering the process.**
- b) **When the processing of a consignment of raw material yields more than one output that is intended for the production of biofuels, bioliquids or biomass fuels, renewable liquid and gaseous transport fuels of non-biological origin, or recycled carbon fuels, for each output a separate conversion factor shall be applied and a separate mass balance shall be used.**

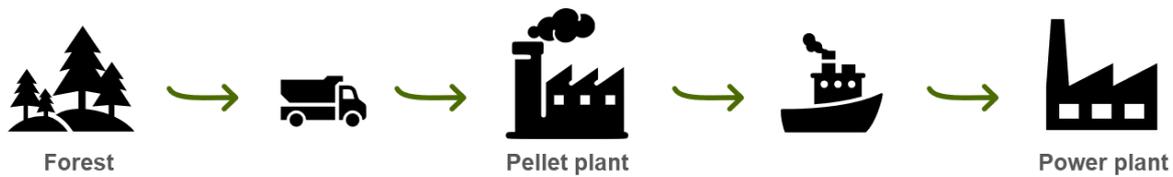
In addition, the Commission Communication from 2010 (160/01) on 'voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme' includes some guidance on mass balance, which remains relevant in this context.

4.3 Concepts, guidelines and calculation examples

The chain of custody is the method by which a claim made about sustainable biomass can be linked to an equivalent amount of sustainable feedstock or raw material at its origin. Sustainability (including greenhouse gas) information has to flow through a supply chain to ensure that claims are robust and relate to an amount of actual sustainable feedstock that was produced.

Figure 14 shows an illustrative example of a typical solid biomass supply chain, through which sustainability information has to flow. The exact supply chain will depend on the situation and biomass type. Sustainability and greenhouse gas information needs to flow from the origin of the raw material through to the energy generator who reports to the Member State to demonstrate compliance with the REDII.

Figure 14. Illustrative example of a solid biomass supply chain



4.3.1 What is a mass balance chain of custody system?

The REDII requires a ‘mass balance’ chain of custody approach to be used. This means that at each step in the supply chain, material with different sustainability characteristics can be **physically mixed**, as long as material sold has the same sustainability characteristics overall as the material that was taken in⁸⁶, i.e. units in = units out (taking into account any conversion factors). Sustainability characteristics can be allocated in a flexible manner to material taken out of the mixture (see section 4.3.8 for further details).

The mass balance approach is designed to facilitate flows in sustainability information in the parts of the supply chain where material is physically mixed (or can be physically mixed⁸⁷). For the parts of the supply chain where materials are not usually mixed for instance due to differences in their physical properties, typical uses or price (even if the materials are located at the same site), then material should be sold with the sustainability characteristics that relate to the specific material.

Alternative chain of custody approaches would be:

- A **‘book and claim’** chain of custody system, which allows separate trading of physical material and sustainability certificates. This is not allowed under the REDII.
- Systems that require physical separation of material streams with different sustainability characteristics and do not allow mixing. This can be called, for example **‘physical segregation’, ‘bulk commodity’ or ‘identity preserved’**. This is not a requirement of the REDII, but an operator who already works in this way would not necessarily be incompatible with the REDII mass balance requirements since physical segregation is a more restrictive chain of custody system compared to mass balance.

Mass balance systems can differ in the details of how they operate, whilst still potentially being in line with the requirements of the REDII. The following sections set out key requirements that a REDII compliant mass balance system must follow.

Key terminology used throughout this chapter includes⁸⁸:

- **Origin:** The origin of the material is the forest/farm/plantation where biomass is produced/harvested, or the site/processing facility that generated the waste or residue. The origin of the material is where the chain of custody needs to start. For example, in the case of forestry residues, the origin and therefore the first point in the chain of custody is the forest. In the case of sawmill residues, the origin and first point in the chain is the sawmill. If wastes or residues are collected across multiple sites, the first point in the chain can be the first collection point (also called first gathering point).

⁸⁶ REDII, Article 30.1(d) “Provides for the sum of all consignments withdrawn from the mixture to be described as having the same sustainability characteristics, in the same quantities, as the sum of all consignments added to the mixture...”

⁸⁷ Sustainability characteristics can be allocated from one consignment to another if the material is stored at the same site, provided the consignments concern the same type of feedstock or product group. This means that the feedstocks have the same or similar physical and chemical characteristics and are treated in the same way under the REDII, i.e. are subject to the same limits or incentives (see Section 4.3.8).

⁸⁸ Terminology list adapted from UK Department for Transport RTFO Carbon and Sustainability guidance, Part 2, 2019 (Section 8.6). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/782800/rtfo-guidance-part-2-carbon-and-sustainability-guidance-year-2019.pdf

The first collection point would need to maintain evidence of where the material has been collected from, e.g. residues from managing municipal parks and roadways in municipality X, or list of independent carpenters or joineries where wastes are collected.

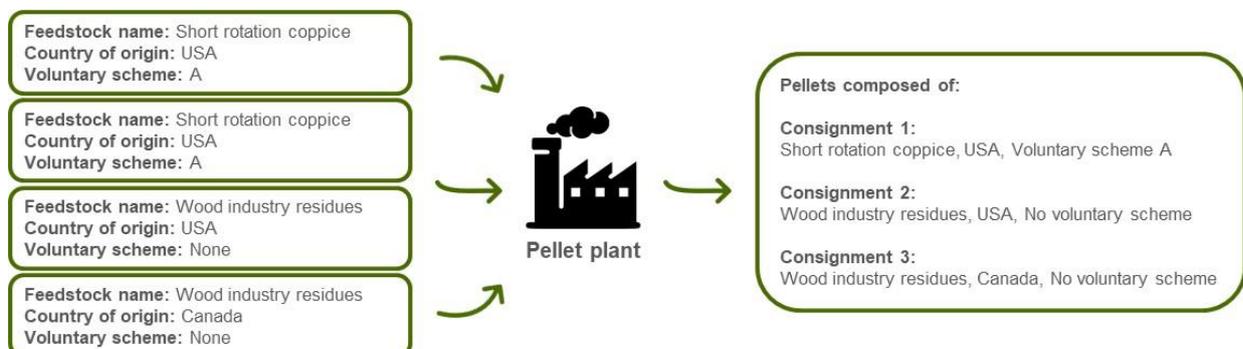
- **Country of origin:** the country in which the biomass 'origin' is located. This is the country in which the original material, residue or waste is harvested or produced (e.g. the forest, sawmill or municipal parks). Note the country of origin must refer to where the material originated and not the country where e.g. the pellet plant is located.
- **Input:** any physical input sourced by any party in the supply chain, e.g. wood chips sourced by a pellet mill or logs sourced by a sawmill.
- **Output:** any physical output supplied by any party in the supply chain, e.g. pellets supplied by a pellet mill or sawdust supplied by a sawmill.
- **Conversion factor:** the amount of output produced per unit of input, e.g. the cubic metres of pellets produced per tonne of logs inputted. Note that a particular site may have more than one conversion factor depending on the number of different types of inputs and outputs.
- **Consignment:** any amount of material with an identical 'set of sustainability characteristics'. With the exception of greenhouse gas information in certain instances, all characteristics must be identical to be aggregated to a single (administrative) consignment. These characteristics are described in the following section.
- **Product group:** refers to biomass with similar physical or chemical characteristics, heating values and/or conversion factors and can therefore be physically mixed in the supply chain, for example wood pellets, wood chips, sawdust etc. Material within the same product group can have different sustainability characteristics and may also have some small physical differences, e.g. moisture content, as long as the product can still be mixed.

4.3.2 How to define a consignment

A consignment in this context refers to an amount of material with **identical sustainability characteristics**, for example feedstock (e.g. short rotation coppice, wood industry residues), country of origin, name of any voluntary scheme used etc.

Consignments with identical sustainability characteristics can be **administratively** combined in a mass balance system keeping system (as well as being physically mixed). Figure 15. shows an example of administratively combining consignments at a single site as part of a mass balance system.

Figure 15. Example of administratively combining consignments



The definition of ‘sustainability characteristics’ is a critical decision that impacts the complexity of the mass balance system. Certain information needs to be passed through the supply chain so operators can report to Member States and demonstrate that the biomass is compliant with the REDII sustainability and greenhouse gas criteria.

Evidence and data to back up the reported information needs to be kept by each operator in the chain and checked as part of an audit. Not all data and evidence needs to be passed down the supply chain.

Box 6. Information that operators should be asked to report to Member States

There is benefit in the European Commission providing guidance on what information needs to be reported by energy generators to Member States per consignment. This will dictate what information needs to be passed down the chain by all operators and how consignments are defined. This will avoid different Member States requesting different information from economic operators, which adds complexity for companies who operate internationally and hinders international biomass trade as companies in the supply chain have to compile the same information in different forms for different countries. The added complexity also risks companies in the supply chain making mistakes in their mass balance systems.

In general, the greater the number of types of information that need to be passed down the supply chain, the more administrative consignments there will be in a mass balance system and so the more complex the mass balance administration will become.

Note that currently FSC and PEFC only pass down the chain whether the material is certified to the scheme or not. For example, no information is currently passed down on country of origin, type of forest the wood came from, greenhouse gas data etc. Additional information will be needed to demonstrate compliance with the REDII sustainability criteria compared to what is often passed down the chain today. A certain amount of complexity is inherent in the system, but too much complexity can lead to an unwieldy system with a higher risk of errors in both record-keeping and auditing, so careful consideration should be given to what information is necessary to report to Member States to demonstrate compliance and what data and evidence is required for a company to know, but does not need to be passed down the chain of custody.

Related to this, there is also benefit in the Commission providing a list of common terminology and definitions. In particular for solid biomass, there is not such a clear distinction between the terminology used for different feedstocks and materials as there is in the biofuels market. For example, the terms stemwood, thinnings, logs or pine (species) might all be used to refer to the same physical material. Similarly, a term like ‘wood chips’ could refer to a material produced at any part of the supply chain (in forest, from a sawmill, from waste wood etc). Inconsistent or unclear terminology causes confusion in the market and hampers the ability of policy makers to compile data and analyse biomass use in a consistent manner.

We recommend that at least the following sustainability characteristics should be **reported to Member States** for solid biomass to demonstrate compliance with the REDII (this information therefore needs to be passed down the supply chain):

- Information relating to what the biomass **physically** is:
 - Biomass form/product group (e.g. pellets, chips, briquettes).
 - Biomass volume (stating clearly in what units and on what basis, e.g. moisture content).
- How the biomass demonstrates compliance with the **sustainability criteria** (Articles 29.6-7) – see section 2). Combination of:

- **Feedstock name** (e.g. short rotation coppice, forest residues, wood industry residues). Consistent terminology should be defined. We recommend that a list of feedstock names is kept as simple as possible and is closely aligned to the terminology used in the greenhouse gas default values in Annex VI to aid greenhouse gas reporting (and checking by auditors or policy makers). In the case of woody feedstocks, we do not recommend that tree species is required to be reported.
- **Country of origin** (note from the definitions section that this is the country in which the original material, residue or waste is harvested or produced, not where e.g. pellets or briquettes are produced).
- Name of **voluntary scheme** (if material is certified):
 - Note that if the material has been certified as a waste or residue (i.e. if the voluntary scheme has judged that the material is exempt from the land-related sustainability criteria and that the scope of the greenhouse gas calculation is from the process of collection), this information should be made clear to the Member State.
- **The greenhouse gas value:**
 - Greenhouse gas intensity/saving must be reported using default values from REDII Annex VI or calculated using actual values and following the REDII methodology.
 - Default values listed in Annex VI can only be applied if the biomass fuel production system and feedstock used for the production of the biomass fuel match their description and scope (e.g. Wood chips from forestry residues, 1 to 500 km distance).
 - When default values are used, information on greenhouse gas emissions should only be reported by the final operator and can be reported as an aggregate. However, when actual values are calculated, it is necessary to split the total amount of emissions into all elements of the GHG emission calculation formula that are relevant.
 - For raw materials and interim products, information on greenhouse gas emissions should be reported in g CO₂eq/dry-ton feedstock or g CO₂eq/dry-ton intermediary respectively. For biomass fuels, information on greenhouse gas emissions should be reported in g CO₂eq/MJ.
 - The final biomass fuel should be reported as a greenhouse gas intensity along with the heat/power plant efficiency and associated greenhouse gas saving. The efficiency information comes from the final operator in the chain, so providing this information does not add complexity to the supply chain. It is important that the greenhouse gas values are reported on a consistent basis and the units are clearly stated.
 - Note that the underlying data used in any actual value calculations does not need to be reported to Member States (although they may request further information if a value seems unfeasible).
 - The start date of the installation should be reported (this information is needed to determine the appropriate greenhouse gas saving for biomass fuels, as set out in Article 29.10).

When consignments with identical sustainability characteristics but **different energy or moisture contents** are mixed, the size of the consignments must be adjusted according to their energy or moisture content (Article 30.1(b)). This should be done as a weighted average.

Consignments with otherwise identical sustainability characteristics, but **different greenhouse gas values** can be combined administratively. However, they cannot be combined for the purpose of

averaging greenhouse gas values to meet the greenhouse gas threshold and become REDII compliant (i.e. consignments that would otherwise not meet the greenhouse gas saving threshold cannot be administratively combined with consignments that would meet the threshold).

If consignments with different greenhouse gas values are combined there are two options:

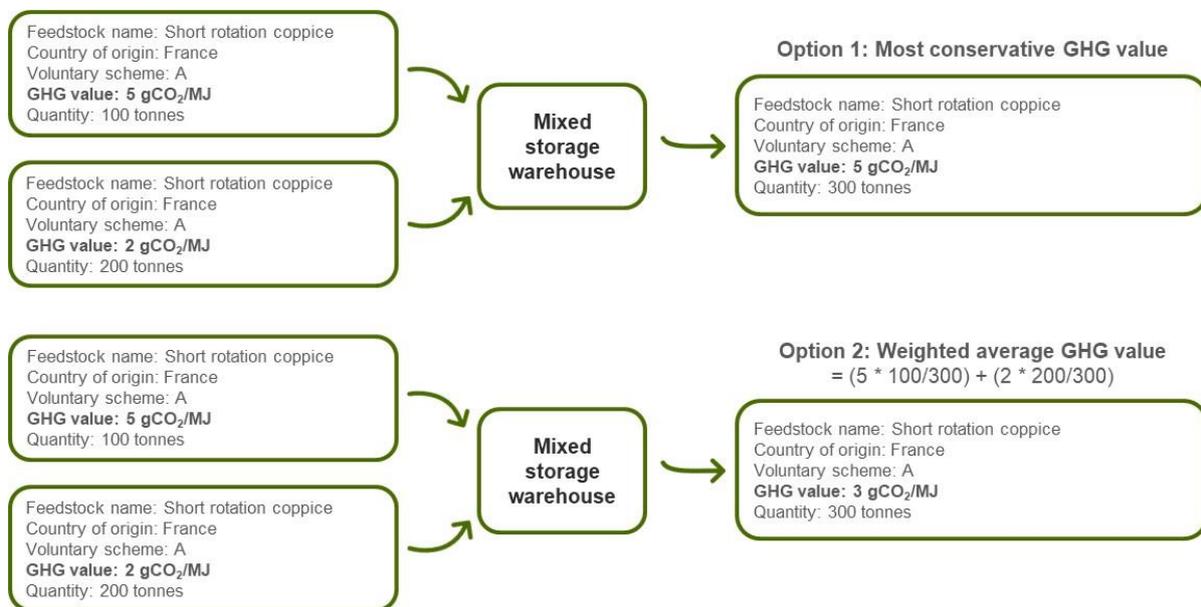
1. Assign the most conservative greenhouse gas value to the combined consignment; or
2. Calculate weighted average greenhouse gas value for the combined consignment.

For biofuels voluntary schemes, the European Commission has expressed a preference that the more conservative first approach is taken. This can be administratively simpler as no calculations are required. It also avoids the complication with the second approach that it is not always possible to judge further up the supply chain whether or not a consignment will meet the greenhouse gas saving threshold as this depends on factors further down the chain (transport distances, whether the material is pelleted, efficiency of the heat/power plant etc).

However, the first approach could also be said to be too conservative and might mean that some parties that would otherwise use actual greenhouse gas values do not as the value in them collecting information is lost when consignments are combined. Some Member States allow the weighted average approach. The UK, for example, allows the approach both for biofuels and solid biomass. We do not see a sustainability risk from allowing operators to choose the weighted average approach, as long as calculations are consistent and transparent, consignments are not averaged for the purpose of meeting the greenhouse gas threshold, and consistent rules are allowed for different forms of bioenergy.

Figure 16. shows an example of aggregating consignments with different greenhouse gas values using each approach.

Figure 16. Example of aggregating consignments with different greenhouse gas intensities



4.3.3 Record keeping and evidence (inputs, outputs, conversion factors)

It is the responsibility of each operator in the supply chain to keep records and evidence of their inputs and outputs to demonstrate that the chain of custody has operated correctly. These records can be subject to independent verification. If there is a break in the chain of custody system, the link can no longer be made between the sustainability of the raw material and the sustainability of the end biomass and it will not be possible to make a claim that the material is sustainable under the REDII.

Information on quantities of inputs and outputs, as well as any conversion factors, needs to be documented and kept up to date by each party in the supply chain. Records of commercial transactions should enable parties in the supply chain (and auditors) to trace back through the supply chain to verify any sustainability data claims made.

An operator's **input-output records** should include, for example:

- Invoice reference
- Description of the physical product
- Volume of product input/output
- Record of appropriate conversion factors (see section 4.3.4)
- Supplying/receiving company
- Transaction date
- Any sustainability and greenhouse gas related information

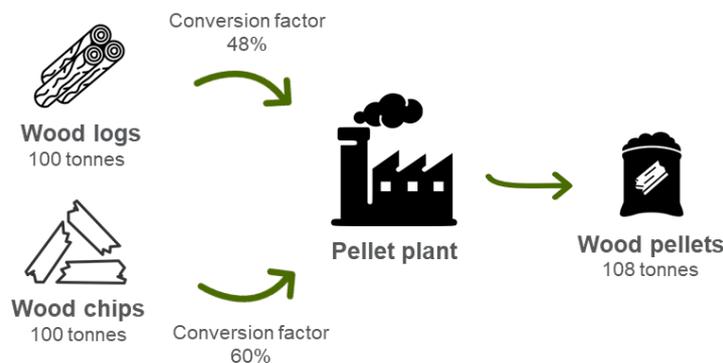
Operators should take care to always record the correct units for all data. This is especially important for volume data (note that the wood industry often works on a “dry weight” basis and the bioenergy industry often works on a “wet weight basis”) and greenhouse gas related data).

Certain sustainability and greenhouse gas related information needs to be passed down the supply chain (as described in the previous section, definition of consignment). The operator responsible at each step in the chain should maintain **evidence** to support the information that they pass down the chain, so that it can be checked in the event of an audit. Wherever possible, this evidence should be kept and organised electronically and should be in the form of official documents such as: land records, sustainability certificates and (where relevant) audit reports, transport or delivery documents, production data, import/export documents, dated invoices etc. The documents that are relevant will depend on what is relevant for that step in the supply chain.

4.3.4 Conversion factors

When an operator is processing material, records should be kept of applicable **conversion factors**. As stated in REDII Article 30.2, conversion factors need to be calculated as the ratio between the mass of the output and the mass of the raw material entering the process. Note that a particular site may have more than one conversion factor depending on the number of different types of inputs and outputs. For example, a site might have different conversion factors for the cubic metres of pellets produced per tonne of logs inputted and the cubic metres of pellets produced per tonne of wood chips inputted (Figure 17). Note that this calculation relates to production data and is independent of the sustainability characteristics (i.e. REDII compliant logs can have the same conversion factor when converted to pellets as non REDII compliant logs).

Figure 17. Example of site with two conversion factors for two different inputs



Conversion factors should be calculated based on a party's own production data and updated at least annually. Companies are recommended to keep records of the conversion factor(s) including⁸⁹:

- To which input product it refers
- To which output product it refers
- The units in which the conversion factor is expressed
- The value of the actual conversion factor
- Dates when the specific conversion factor is valid; and
- Any calculations and supporting documentation that determines the conversion factor

4.3.5 Accounting for gains or losses

Gains and losses of material may occur along the supply chain, for example, through variation in tolerances of meters and gauges, drying or degradation during storage or losses during handling or transportation. It is in the interest of companies to apply appropriate controls to minimise such gains or losses. Where gains and losses do occur, sustainability data should ideally be adjusted in proportion to the volume of material gained/lost at regular intervals. It is however recognised, that if gains and losses are negligible, adjusting all administrative consignments by a very small amount may be unnecessarily complex.⁹⁰

4.3.6 Operating a mass balance at the level of a site

Article 30.1(a) of the REDII allows consignments “*to be mixed for instance in a container, processing or logistical facility, transmission and distribution infrastructure or site*”. Site is defined as a “*geographical location with precise boundaries within which products can be mixed*”.⁹¹ A site can contain multiple silos, warehouses or tanks, as long as they are at the same physical site.

This means that an operator needs to track their inputs and outputs at each physical site they operate. For example, if a company has more than one production plant, they must operate a mass balance system for each production site. This applies throughout the supply chain, including sites used for storage as well as processing.

If more than one legal entity is operating at a single site (for example at a port), each legal entity must operate its own mass balance system at the site covering the material that they own. In addition, if there are different types of product kept at a single site (different “product groups”), the operator may need to keep separate mass balance records for the different product groups (see section 4.3.8).

Note that the mass balance approach is designed to facilitate flows in sustainability information in the parts of the supply chain where material is physically mixed (or can be physically mixed). For the parts of the supply chain where materials are not usually mixed for instance due to differences in their physical properties, typical uses or price (even if those materials are located at the same site), then material should be sold with the sustainability characteristics that relate to the specific material.

In general, transport companies do not take legal ownership of the material and are only responsible for transferring material from one site to the next, and so do not have to set up their own mass balance system. The same can be the case for traders who do not take legal ownership of the material.

⁸⁹ Adapted from Ofgem, Renewables Obligation: Sustainability Criteria, 24 April 2018, Table 7. Available from: https://www.ofgem.gov.uk/system/files/docs/2018/04/ro_sustainability_criteria.pdf

⁹⁰ For example, for biofuels and bioliquids, the ISCC voluntary schemes allows deviations in the mass balance of up to 0.5%.

⁹¹ Commission Communication on voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme (2010 160/01). <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:160:0001:0007:EN:PDF>

4.3.7 Appropriate period of time

Article 30.1(d) states that the balance must be “achieved over an appropriate period of time”. Commission Communication 2010 160/01 advises that “*The balance in the system can be continuous in time, in which case a ‘deficit’, i.e. that at any point in time more sustainable material has been withdrawn than has been added, is required not to occur. Alternatively, the balance could be achieved over an appropriate period of time and regularly verified.*”

This means that inputs and outputs can be “balanced” on a continuous time basis. Or operators can keep day to day records, but only need to ensure that the balance is maintained periodically, and in between this time it could be possible for a deficit in sustainable material to occur.

There is currently no definitive statement in the legislation on what an appropriate period of time is. In the Commission’s assessments of biofuels voluntary schemes to date a period of maximally three months has been used. This time period is chosen to strike the balance between being practical and fitting with existing company processes (which are often quarterly if not monthly), and allowing some flexibility to trade material over time, while having a short enough period of time that operators are not able to build up large risks.

Having a deficit in sustainability data is not advised, and economic operators would usually try to avoid this, but it can be useful to help manage the day-to-day realities of trade and complex supply chains. For example, paperwork might be delayed or operators might be competing for limited processing or shipping capacity which can result in physical flows having different timing to contractual paperwork.

Many of the current Commission recognised voluntary schemes for biofuels and bioliquids allow the option to operate a three-month mass balance. Note that Member States may require monthly reporting by obligated parties. This does not necessarily preclude the rest of the supply chain from operating a three-month mass balance.

Any timeframe used by an operator should be transparent and consistent (i.e. regardless of timeframe, the mass balance period should not be changed over time).

The most widely used chain of custody system for existing forestry certification schemes (FSC and PEFC) is currently the credit-based system. This is a mass balance type system and still follows the basic units in = units out principle, but has an important difference to the 3-month mass balance period operated by most of the Commission-recognised biofuels voluntary schemes under the RED.

For biofuels voluntary schemes, the Commission currently requires that to carry sustainability information over to the next mass balance period, an operator must have at least the same quantity of physical stock.

However, under the FSC and PEFC credit-based systems, sustainability information comes into a site linked to a physical flow of material. The sustainability information (“credits”) enters a credit account (similar concept to a bank account) until the operator decides to sell the credits with some physical material. If a customer does not require sustainability information, physical material can be sold and the credit can stay in the credit account. If a customer requires sustainability information, credits are allocated to a physical flow of material (following rules on product group etc outlined in the next section). In this way, operators can get the economic value from selling the credits to their customers who value that information. Credits have a validity of one or two years, depending on the scheme, after which time they expire from the credit account. The transfer of sustainability credits is always with a physical flow of material and operators are never allowed to have a deficit in sustainability credits. But, the amount of credits in an operator’s account does not have to match the physical quantity of material on a site, as is required for biofuels at the end of each mass balance period.

The physical stock point has been a big discussion point with the biofuels schemes. Most of the biofuels schemes are now recognised on this basis although there are still claims from the biofuels market that this is not what many operators are doing in practice, or at least auditors are not focusing on this point when auditing the mass balance so it is not enforced. There are also claims that the requirement to have physical stock in a certain place at the end of a mass balance period leads to additional and avoidable GHG emissions from transporting biomass to different sites to meet the requirements. In addition, the credit-based system is in effect the same system as used by 2BSVs at the agricultural end of the biofuels supply chain.

Those Member States who currently give guidance on sustainability requirements for solid biomass (UK and NL) are not explicit on the types of chain of custody that can be used under existing voluntary schemes, as long as they are fundamentally a mass balance type system.

We recommend the Commission to consider whether the credit-based approach could be considered to be legally in line with the REDII definition of a mass balance system.

We would anticipate significant stakeholder push back from the existing solid biomass industry if they have to adapt their mass balance systems to follow the approach used in the biofuels industry. Similarly, if the Commission did decide to allow the credit-based approach for solid biomass, we would expect there to be demand from the biofuels industry to have this as an option.

Advantages of credit-based system:

- Well known and understood by forestry industry, has been working for 10+ years.
- Allows operators to sell sustainability credits to operators who value that information.
- No additional greenhouse gas emissions from movements of physical stock at the end of a mass balance period.
- Can be robust. No deficit in sustainability information allowed at any point (which can be allowed with 3-monthly mass balance period). (Note that stakeholders we spoke to in the solid biomass industry did not recognise the “appropriate timeframe” discussion because for them a deficit is never allowed.).

Disadvantages of a credit-based system:

- Not desirable to allow different chain of custody approaches for different parts of the bioenergy industry. Likely to be demand from some biofuels schemes to adapt their approach or offer different options.
- The Commission has argued to biofuels schemes that a credit system does not respect the definition of mass balance in the Directive “(c) Requires information about the sustainability and greenhouse gas emissions saving characteristics and sizes of the consignments referred to in point (a) to remain assigned to the mixture”. The credit system does mean that credits can be held in an account without physical stock on site, but the credit must be linked to a physical flow of material when it enters and leaves a site.

4.3.8 Allocating sustainability data to outgoing consignments

The mass balance approach is designed to facilitate flows in sustainability information in the parts of the supply chain where material is physically mixed (or can be physically mixed). For the parts of the supply chain where materials are not usually mixed for instance due to differences in their physical properties, typical uses or price (even if those materials are located at the same site), then material should be sold with the sustainability characteristics that relate to the specific material.

When material is mixed, operators need to decide how to allocate sustainability and greenhouse gas related information to outgoing consignments from what has entered the site. Under a mass balance system it is permitted to freely allocate data to outgoing consignments, as long as:

- The ‘set of sustainability characteristics’ remains together, and
- The overall mass balance principles are respected (i.e. inputs = outputs)

The ‘set of sustainability characteristics’ is all sustainability and greenhouse gas information known about a consignment. For example, if a party has wood chips certified to voluntary scheme A from country B and uncertified wood chips from country C, the individual sustainability characteristics could not be swapped between the consignments. So, it would not be possible to sell wood chips certified to voluntary scheme A from country C and uncertified wood chips from country B.

Sustainability information can be allocated from a mixture on a **proportional** or **non-proportional** basis. If information is allocated on a proportional basis, material removed from a mixture containing different consignments is assigned sustainability characteristics in the same proportions as the original mixture. For example, if 400 tonnes of short rotation coppice wood chips and 600 tonnes of wood industry residue wood chips are mixed, when you sell on a volume of wood chips you can apply these proportions to the amount sold (i.e. 40% is from short rotation coppice and 60% is from wood industry residues). See Figure 18.

If information is allocated on a non-proportional basis, material removed from a mixture can be assigned sustainability characteristics from any of the consignments in the original mixture in any proportion. So, for example, if the short rotation coppice and wood industry residue chips are physically mixed, they could be sold to customer A and customer B as 100% short rotation coppice and 100% wood industry residues respectively, as long as the overall quantities and mass balance rules are respected. See Figure 19.

Figure 18. Example of allocating information on a ‘proportional’ basis

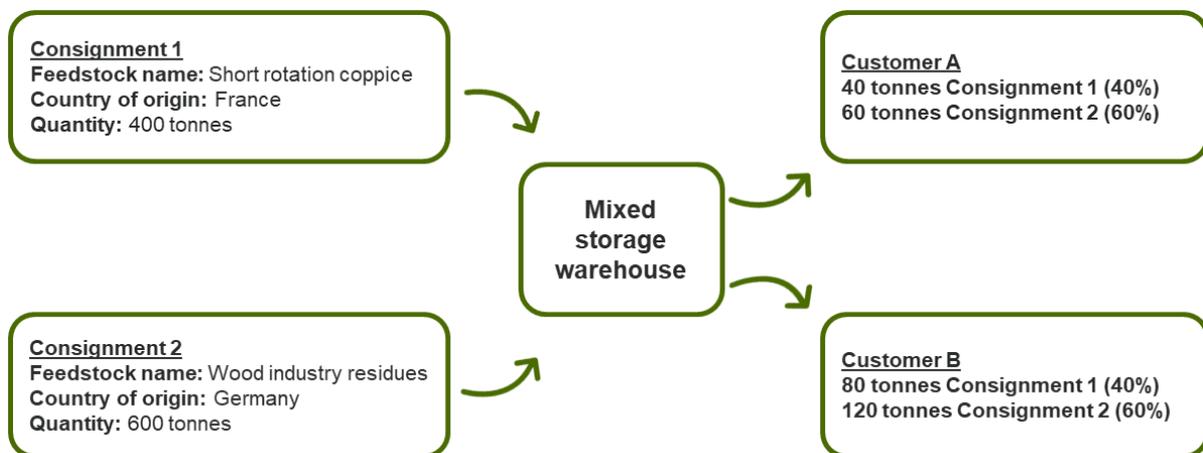
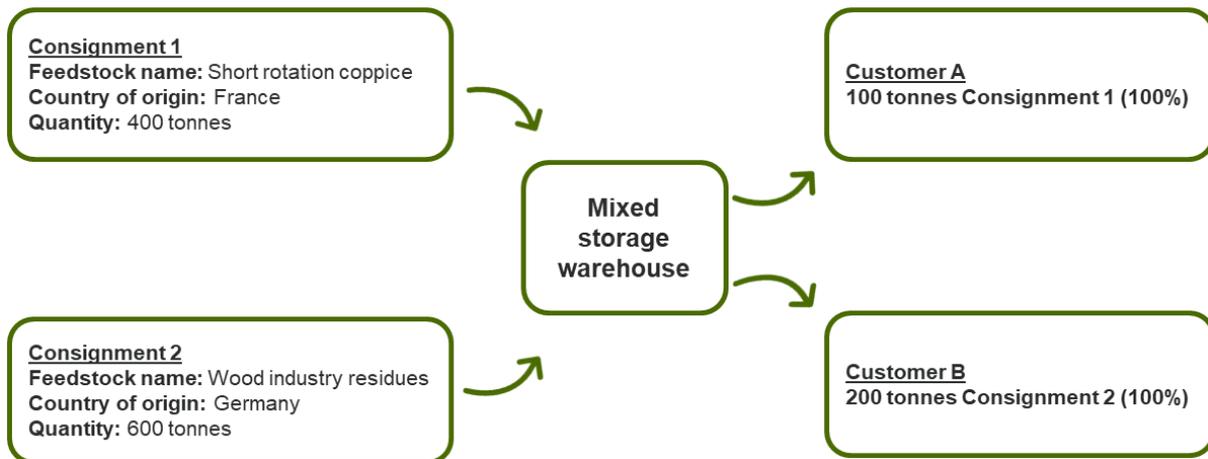


Figure 19. Example of allocating information on a ‘non-proportional’ basis



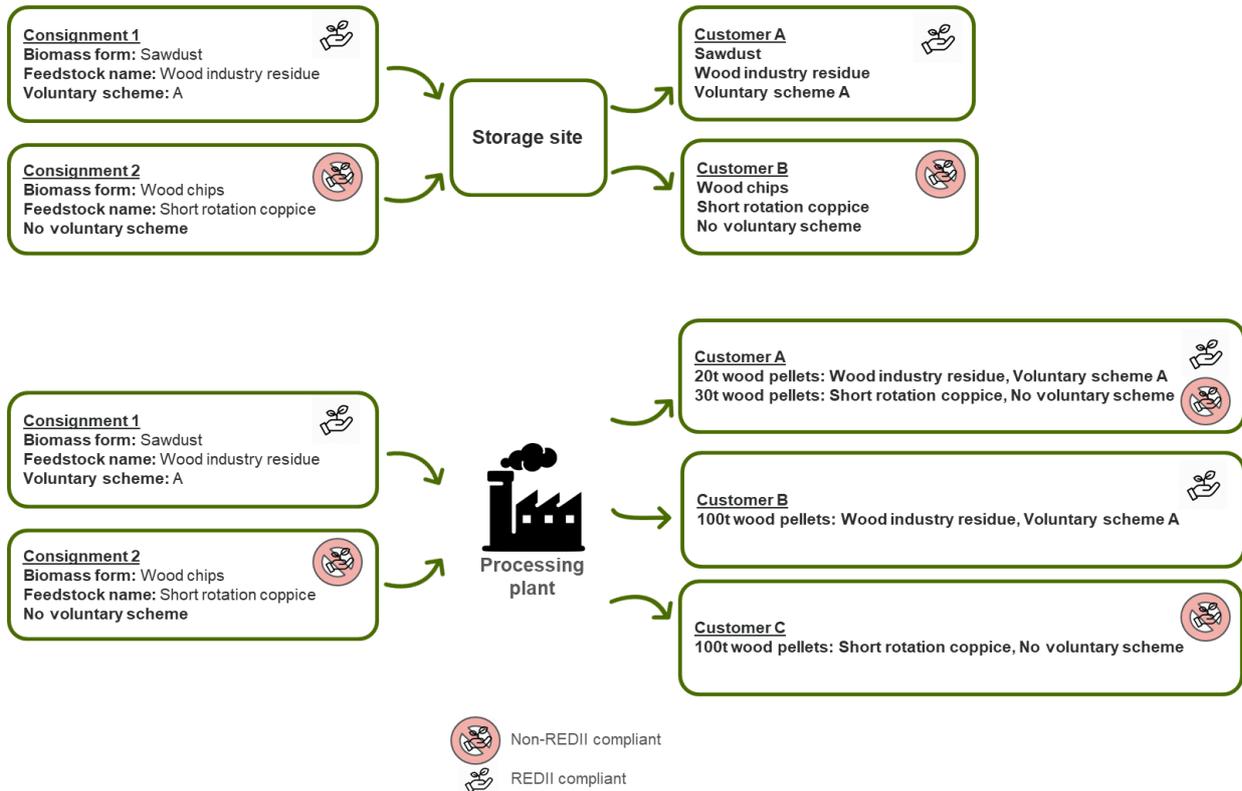
Under the REDII, it is permitted to allocate sustainability information on a proportional or non-proportional basis. However, operators may find there are examples where a particular approach works better for their circumstances. For example, if a customer requests a particular feedstock blend for technical purposes, it can be logical to accompany that physical flow with matching sustainability information. For example, if a customer requests pellets made from wood industry residues and waste wood, sustainability data should be passed on that matches that feedstock mix, even if other sustainability data is available in the mass balance system.

As stated, the mass balance approach is designed for the parts of the supply chain where material is or can be physically mixed. So, if a site contains short rotation coppice wood chips and wood industry residue chips that are not mixed, any unmixed chips sold from that site should be sold with the sustainability characteristics that relate to that feedstock/material.

When more than one ‘**product group**’ is contained on a site, sustainability characteristics can only be assigned to the same ‘product group’ that they originated from. This is logical because in most cases different ‘product groups’ would not be physically mixed on a site. ‘Product group’ is defined by similar physical or chemical characteristics, heating values and/or conversion factors.⁹² For example, if a site is used to store both sawdust and wood chips, data relating to the sawdust must remain assigned to the sawdust and cannot be assigned to the wood chips. However, if the two materials are processed into wood pellets on that site, then the sustainability data from either material can be assigned freely to the outgoing wood pellets (applying appropriate conversion factors), see Figure 20.

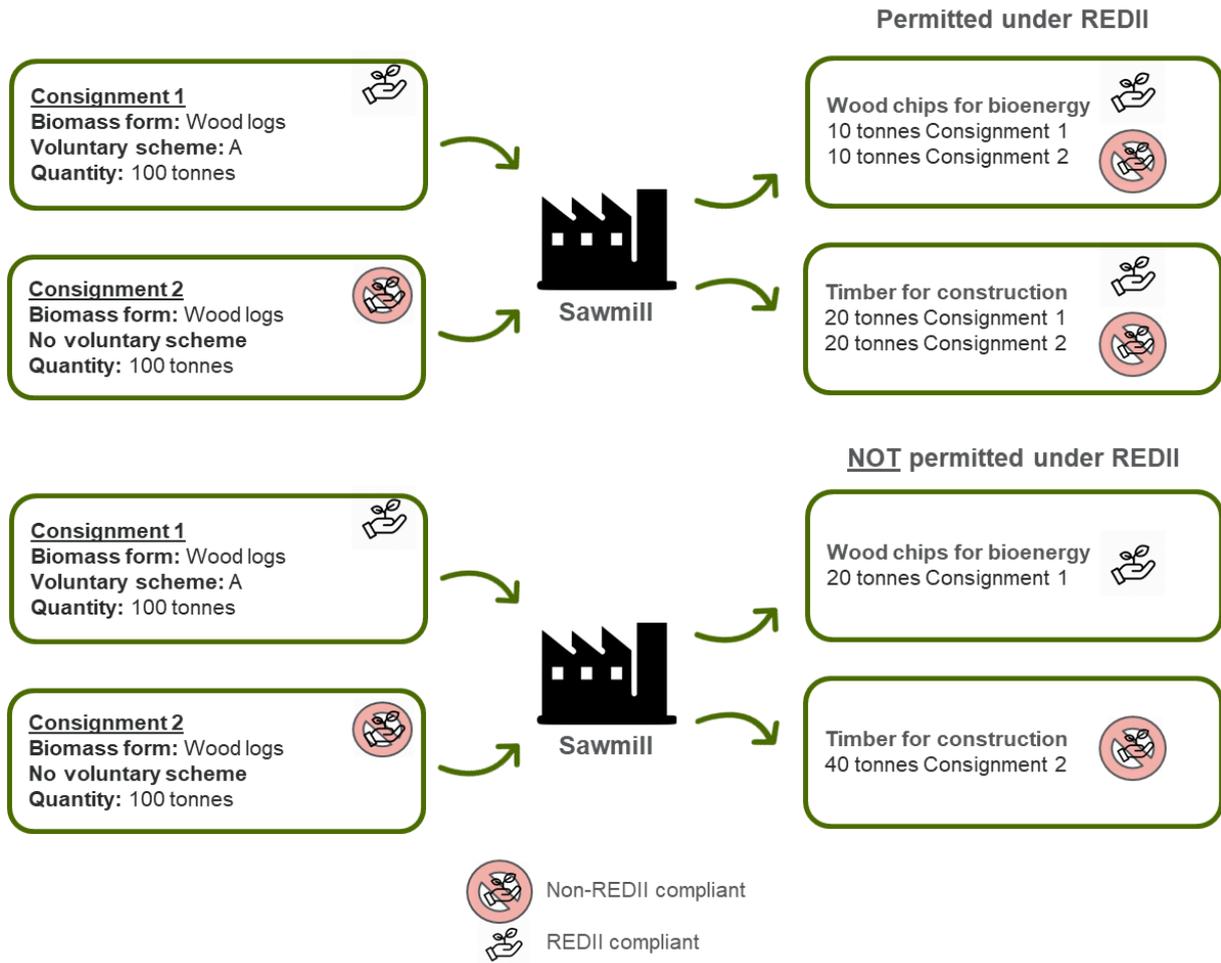
⁹² Definition of ‘product group’ from ISCC standard 203 Traceability and Chain of Custody, Version 3.0. Section 3.3.2. Available from: https://www.iscc-system.org/wp-content/uploads/2017/02/ISCC_203_Traceability_and_Chain-of-Custody_3.0.pdf
FSC Chain of Custody guidance also provides guidance on appropriate product groups (e.g. Table G), available from: <https://www.fsc-uk.org/en-uk/business-area/fsc-certificate-types/chain-of-custody-coc-certification>

Figure 20. Example of information remaining assigned to a ‘product group’



When a process produces more than one product/product group, sustainability information should be allocated on a proportional basis to the outputs of that process. This is especially important if one of the products is not going to the bioenergy market. For example, if a sawmill takes in 50% REDII compliant logs and 50% non REDII compliant logs and produces saw logs for the timber industry and wood chips for the bioenergy industry, the saw logs and the wood chips must each be sold with 50% REDII compliant volume. It is not permitted to allocate all/more REDII compliant information to the wood chips that are going to the bioenergy industry than to the saw logs, or vice versa (Figure 21).

Figure 21. Example of proportional allocation when multiple products are produced



Appendix A. STAKEHOLDER CONSULTATION

[Please note this section will be updated based on the workshop of 25th June]

Throughout the REDIIBIO project a range of stakeholders have been consulted. The purpose of the consultation is to support the Commission in its dialogue with stakeholders with the view to collect feedback on the proposed approaches/methods. This will guarantee the accuracy and objectivity of the overall project findings. The consultation will take place in various forms such as project workshops, presentation at a selection of other meetings/workshops and bilateral outreach.

In the following sections we provide details on the stakeholder workshop and interaction with other stakeholders.

A.1. Stakeholder workshops

The REDIIBIO project includes the organization of **two stakeholder workshops**, one in the fall of 2019 and one in the spring of 2020. The first stakeholder workshop was held on the 11th of October 2019 in Brussels and attended by a wide range of organisations. A second stakeholder workshop will be held in Spring 2020, where draft checklists technical proposals for a guidance document, as well as draft country sheets and results of the case studies will be presented.

Table 17. List of Attendees - 19th October 2019 Workshop

Organisation	Name
2BSvs	Luis Da Silva E Serra
Austrian Chamber of Agriculture	Andreas Thurner
AVEBIOM	Pablo Rodero
Belgium DG Env	Ivo Cluyts
Bioenergy Association of Finland	Hannes Tuohiniitty
BioenergyEurope	Jean-Marc Jossart
BioenergyEurope	Nathalie Hemeleers
Byrne Ó Cléirigh Consulting	Shane Malone
CAN Europe (EU Energy Policy Coordinator)	Veerle Dossche
CERTH	Manolis Karampinis
Clariant	Paul Popescu
Confédération Européenne des Propriétaires Forestiers (CEPF)	Meri Siljama
Confederation of European Paper Industries (CEPI)	Ulrich Leberle
Danish energy agency	Bodil Harder
Drax	Laura Craggs
Engie	Yves Ryckmans
Enviva (US pellet manufacturer)	Justin Tait
European Confederation of Woodworking Industries (CEI-Bois)	Margherita Miceli
European farmers and agri-cooperatives COGECA	Oana Neagu
European farmers and agri-cooperatives COPA	Dominique Dejonckheere
European Landowners' Organization asbl (ELO asbl)	Oskar Zemitis
European pellet council	Gilles Gauthier
European State Forest Association (EUSTAFOR)	Amila Meskin
FERN	Katja Garson
Finland Ministry of Economic Affairs: Energy Dept	Jukka Saarinen

Organisation	Name
Fortum Corporation	Kari Kankaanpää
France MS	Ms Johanna Flajollet-Millan
French Ministère de l'agriculture et de l'alimentation	Guénola Julienne
French Ministry for an ecological and solidary transition	Elisabeth Pagnac-Farbiaz
German government - Department Bioenergy Systems	Stefan Majer
IINAS	Uwe Fritsche
ISCC	Peter Hawighorst
NEPCON DK	Ondrej Tarabus
PEFC	Xavier Nyogen
Poland	Agnieszka Kedziora-Urbanowicz
Polish Department of Forestry	Monika Figaj
Polish Directorate General of State Forests	Tomasz Majerowski
RSB	Elena Schmidt
RVO	Timo Gerlagh
SBP	Simon Armstrong
Spain MS	Francisco José Domínguez Pérez
Stichting BirdLife Europe (BirdLife Europe)	Luke Edwards
SUSTAINABLE RESOURCES	Thomas Siegmund
Transport & Environment	Luca De Bruyckere
US Industrial Pellet Association	Jessica Marcus
Utrecht University	Ric Hoefnagels
Wageningen University	Anouk Cormont
WWF	Alex Mason

A.2. Details other interaction with stakeholders

The following table (Table 18) provides details on the interaction with stakeholders as ongoing throughout the REDIIBIO project. Besides these interactions, additional stakeholders were contacted through the work on the country sheets, case studies and bilateral/informal exchanges.

Table 18. Details on stakeholder interaction

Organisation	Name	Date	Comment
Committee on Sustainability of biofuels and bioliquids	MS representatives	11-10-2019	Project team presented to the Committee and received input from the MS representatives
Stakeholder workshop	Various	11-10-2019	See above for details
Bioenergy Europe	All members	01-11-2019	Detailed comments and inputs sent in response to the workshop background paper.
Forestry organisations	Representatives of CEPF, CEPI, Eustafor and CEI-Bois	13-11-2019	Discussion for clarifications and receiving inputs and suggestion.
Bioenergy Europe	Working group sustainability	20-11-2019	
CA-RES meeting	MS representatives	27-11-2019	Forest biomass criteria

Organisation	Name	Date	Comment
CA-RES meeting	MS representatives	28-11-2019	Agricultural biomass criteria
SBP – Sustainable Biomass Program	Simon Armstrong	12-12-2019	Detailed discussion on operation of SBP forest biomass certification
PEFC – Programme for Endorsement of Forest Certification	Xavier Noyon	12-12-2019	Detailed discussion on operation of PEFC forest certification
SFI – Sustainable Forest Initiative	Nadine Block, Gregor Macintosh, Jason Metnick	18-12-2019	Shared information on the SFI Fibre Sourcing Standard
Danish Energy Agency	Bodil Harder	24-11-2019	Connecting on proposed case study related to Article 29.2 on the criteria on waste and residues
2BSvs	Luis Da Silva e Serra	14-10-2019	Provided information on the ELBA tool
German Biomass Research Centre	Stefan Majer	18-10-2019	Provided input in relation to harvesting of agricultural residues
BirdLife International and International Union for Conservation of Nature	Luke Edwards Ashley Simkins Olivia Crowe Andrew Plumtre	18-11-2019	Provided information on the listing of Key Biodiverse Areas
Institute for the Diversification and Supply of Energy within the Spanish Ministry of Ecological Transition	Francisco José Domínguez Pérez	13-12-2019	Connecting on a possible case study
EFECA	Matthew Ford	12-12-2019	Matthew shared his experiences with UK solid biomass system and sustainability criteria
ENVIVA	Justin Tait	20-11-2019	Information related to US forestry sector
USDA	Jan Lewandrowski	04-12-2019	Connecting on US Forest Inventory and its potential use for the LULUCF criteria/case study
Italian Energy Services Manager	Unit data and analysis	13-12-2019	Establishing contact should a case study on Italy be selected as related to Article 29.2.
RVO	Timo Gerlagh	19-11-2019	Input provided on comparison Dutch solid biomass criteria and REDII
Vlaamse Overheid	Jimmy Loodts	16-12-2019	Input provided on mapping of Flemish and Dutch solid biomass criteria
RWE	Ronald Zwart, Peter-Paul Schouwenberg	21-11-2019	Information on their sourcing of sustainable feedstock
Engie	Yves Ryckmans	14-10-2019	Provided input to sustainable forest certification
SBP – Sustainable Biomass Program	Simon Armstrong	13-02-2020	Discussion on the application of the mass balance rules for solid biomass
ASI - Accreditation Services International	Ana Dahlin	19-02-2020	Discussion on the application of the mass balance rules for solid biomass
ENCE	Irene Carrascón Iglesias		

Organisation	Name	Date	Comment
Committee on sustainability of biofuels and bioenergy		14-05-2020	Presentation to the Committee to receive feedback on the approach and draft results.
Bioenergy Europe		09-06-2020	Presentation to Bioenergy Europe on the approach and REDIIBIO project, receiving feedback from their members.
NEPCON		15-06-2020	Discussion on scope and information in the NEPCON timber risk assessments

A.3. Desk-based research

Besides the stakeholder contacts as mentioned in the two previous sections, extensive desk-based review of literature, legislation and certification schemes took place.

A detailed analysis of indicators and evidence requested by range of certification schemes and sources was made. The precise documents of certain certification systems, norms, government programs and projects which have been considered in this study, are stated below (Table 19). It has to be noted that the intention of the review was to collect inspiration from established practice. It was not the intention to make a partial or full assessment of the capability of a scheme to demonstrate compliance with REDII and the results of this review should not be taken in that regard.

Table 19. Initial certification schemes and sources reviewed

Scheme/Source	Source document
SBP	Sustainable Biomass Partnership. SBP Framework Standard 1: Feedstock Compliance Standard. Version 1.0 March 2015
FSC	Forest Stewardship Council. FSC International Generic Indicators: FSC-STD-60-004 V2-0 EN. 01 July 2018
PEFC	PEFC Checklist - Sustainable Forest Management - Requirements (PEFC ST 1003:2018)
ISO13065	International Standard ISO-13065. Sustainability criteria for bioenergy. First edition. 2015-09-15
NL_RVO	Verificatieprotocol duurzaamheid vaste biomassa voor energietoepassingen, Ministry of Economic Affairs and Climate, December 2017
UK-DECC	Department of Energy & Climate Change, 2014. Risk Based Regional Assessment: A Checklist Approach. 22 December 2014. Crown copyright. United Kingdom
UK_WAS	United Kingdom Woodland Assurance Standard Fourth Edition; Version 4.0: approved by the Steering Group, 31 August 2017. Effective from 1 April 2018

Scheme/Source	Source document
Dutch Norm NEN-EN 16214-3+A1:	Dutch Norm NEN-EN 16214-3+A1: Sustainability criteria for the production of biofuels and bioliquids for energy applications - Principles, criteria, indicators and verifiers - Part 3: Biodiversity and environmental aspects related to nature protection purposes

The analysis comprised of the compilation of all indicators in the certification schemes possibly relevant to the sub-paragraphs of article 29.6(b). The selected indicators addressed the individual topics to a more or less similar manner and extent. In a next step the indicators directly referring to the legal text in the REDII were isolated. Indicators and criteria that would have partially introduced new issues were left out and emphasis was put on the operationalization of the criteria and the possible proof, relevant for harvesting operations according to Article 29.6(b).

In the final selection of condensed and adjusted indicators, specific thresholds have been renounced because of the impracticality of one-size-fits-all solutions for Europe, let alone the world, due to the diversity of forest types, management practices, environmental influences, climatic conditions and statutory frameworks.

Appendix B. COUNTRY SHEETS

A set of country sheets has been developed as examples of applying the methods and checklists to 32 countries. 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 Evidence A route – compliance on a national/subnational level).

The country sheets do not hold any legal value and solely used for the purpose of testing the methodology developed for the level A.

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.

For European countries that do not have forest legislation arranged on national level (e.g. Belgium, Germany, Italy, Spain), only one country sheet has been produced, but all regions will be checked as part of a regional assessment. The criteria are met only if they are met in each region. For the country sheets for USA and Canada (forest legislation arranged on state level and not on federal level), two states were selected as examples.

The data-collection process was desk-based, but where information was difficult to retrieve through desk-based research, we have reached out to experts or in-country contacts (for example at the governments) to point us in the direction of most relevant legislation.

B.1. Description of country sheet development

The country sheets present a legal analysis to assess if current national and sub-national legislative frameworks meet the sustainability criteria for forest biomass **at level A**.

Please note these country sheets are merely a ‘snapshot’ of the current situation in countries. They are not a set of country sheets to be maintained over time nor do they hold any legal value. Once the guidance on forest biomass sustainability criteria is set, a verifier will need to assess if countries comply at national level.

They were developed as examples how to apply the stepwise approach as presented in the section 2.2.3 and 2.2.4. See below a summary of the criteria and the type of proof.

For the requirements on laws, country experts have reviewed national legislation together with sub-national legislation where required, and added the reference to the relevant law and its specific article covering the criteria mentioned. For several countries underlying regulations, guidelines or technical codes were also added in the references. Please note that in this assessment no effectiveness of the law was included. The assessment only aimed to identify whether laws covering the criteria and sub-criteria existed.

For the assessment on enforcement specifically, the following checks were done:

- Check if relevant national or sub-national laws/regulations include monitoring/enforcement provisions, including sanctions:
 - References to relevant articles and regulations were included
- Check the absence of robust evidence of significant and systematic lack of enforcement.
 - First a check was done if the Commission has an ongoing infringement procedure against the country. If this is the case, the summary of the complaint was reviewed to assess for which criteria enforcement should be set to No (e.g. Romania)
 - Secondly UNEP-WCMC briefing notes of the past two years were reviewed to check if the country was mentioned for serious offenses in those. If this was the case, the description of the comment was used to assess for which criteria enforcement should

be set to No (example Romania). If the comment indicated 'corrupt or dysfunctional forest governance' all criteria on sustainable harvesting were set to No.

REDII Criteria		Requirement	Type of proof
29.6a(i)	Harvesting legality	Laws	<ul style="list-style-type: none"> • Certificate of due diligence required under the EU Timber Regulation (EUTR, (EU) 995/2010)
29.6a(i)	Harvesting legality	Monitoring/ Enforcement	<ul style="list-style-type: none"> • Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement
			<ul style="list-style-type: none"> • Proof that the relevant Member States is not subject to any on-going EU infringement procedure for non-compliance with the EU Timber Regulation
29.6a(ii)	Forest regeneration	Laws	<ul style="list-style-type: none"> • Legal analysis showing that the relevant legislation complies with the forest regeneration criteria
29.6a(ii)	Forest regeneration	Monitoring and enforcement	<ul style="list-style-type: none"> • Legal analysis showing that the relevant forest legislation includes monitoring and enforcement requirements for forest regeneration
			<ul style="list-style-type: none"> • Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement
29.6a(iii)	Protected areas	Laws	<ul style="list-style-type: none"> • Legal analysis showing that the relevant legislation complies with the protect areas requirement
29.6a(iii)	Protected areas	Monitoring and enforcement	<ul style="list-style-type: none"> • Legal analysis showing that the relevant forest legislation includes monitoring and enforcement requirements for protected areas
			<ul style="list-style-type: none"> • Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement
29.6a(iv)	Maintenance of soil quality and biodiversity	Laws	<ul style="list-style-type: none"> • Legal analysis showing that the relevant legislation complies with the maintenance of soil quality and biodiversity criteria
29.6a(iv)	Maintenance of soil quality and biodiversity	Monitoring and enforcement	<ul style="list-style-type: none"> • Legal analysis showing that the relevant forest legislation includes monitoring and enforcement requirements for protected areas
			<ul style="list-style-type: none"> • Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement
29.6a(v)	Long-term production capacity	Laws	<ul style="list-style-type: none"> • Legal analysis showing that the relevant legislation complies with the long-term production capacity criteria
29.6a(v)	Long-term production capacity	Monitoring and enforcement	<ul style="list-style-type: none"> • Legal analysis showing that the relevant forest legislation includes monitoring and enforcement requirements for long-term production capacity
			<ul style="list-style-type: none"> • Proof that there is no evidence from national or international governmental organizations that there is significant and continue lack of enforcement

To illustrate the methodology used, we provide in the following section examples on how the assessment was done.

For Canada (British Columbia) on forest regeneration and its related enforcement system

Forest regeneration – name of law and article	Article text
Forest and Range practices Act of 2002 Part 3, Division 4 § 29	<p>Free growing stands:</p> <ol style="list-style-type: none"> 1) A holder of a major licence or community forest agreement who harvests timber to which a forest stewardship plan applies must establish in accordance with the plan, the prescribed requirements and the standards, a free growing stand on those portions of the area of the harvest that are in the net area to be reforested. 2) If the timber sales manager <ol style="list-style-type: none"> a. Has authorized the harvesting of timber under a timber sale licence that requires its holder to prepare a forest stewardship plan, or b. Is the holder of a forest stewardship plan c. He or she must establish in accordance with the plan, the prescribed requirements and the standards, a free growing stand on those portions of the area of the harvest under the plan that are in the net area to be reforested 3) A holder of a woodlot licence who harvests timber under the licence must establish a free growing stand on those portions of the area of the harvest that are in the net area to be reforested in accordance with <ol style="list-style-type: none"> a. The woodlot licence plan, if any, that is pertinent to the licence b. The prescribed requirements, and c. The standards 4) [Repealed 2003-55-18.] 5) to (10)[Repealed 2004-36-89.]
Forest Planning and Practices Regulation of 2004 (FPPR) - Section 16	<p>Stocking standards – 16:</p> <ol style="list-style-type: none"> 1) A person required to prepare a forest stewardship plan must ensure that the plan specifies the situations or circumstances that determine when section 44 (1) [free growing stands generally] or section 45 [free growing stands collectively across cutblocks] will apply to an area. 2) In specifying a stocking standard under this section, a person who prepares a forest stewardship plan may consider the factors set out in section 6 [factors relating to stocking standards] of Schedule 1. 3) A person required to prepare a forest stewardship plan must ensure that the plan specifies, for each of the situations or circumstances specified under subsection (1) where <ol style="list-style-type: none"> (a) Section 44 (1) (a) will apply, the regeneration date and stocking standards, (b) Section 44 (1) (b) will apply, the free growing height and stocking standards, (c) Section 45 (1) will apply, the regeneration date and the stocking standards, and (d) Section 45 (2) will apply, the free growing date and the stocking standards, as approved by the chief forester. 4) A person required to prepare a forest stewardship plan must ensure that the plan specifies stocking standards for areas referred to in section 44 (4), and the situations or circumstances that determine when the stocking standards will be applied. 5) A holder of a major licence that is a forestry licence to cut entered into under section 24.8 of the Forest Act or converted into a forestry licence to cut under section 24.9 of the Forest Act is exempt from this section.
Forest and Range Practices Act- Division 4 § 29	<p>“A person who contravenes section 21 (1), 22 (2), 29 (1) or (3) or 55 (a) commits an offence and is liable on conviction to a fine not exceeding \$500 000, or to imprisonment for not more than 2 years, or to both.”</p>

For Ireland on 'minimizing impacts on biodiversity during harvesting of forest biomass and its related enforcement system:

Biodiversity impacts - name of article	Text article
Forestry Act 2014	The Forestry Act 2014 and the Forestry Regulations 2017 require a person to apply to the Forest Service for a licence to fell trees, unless the trees are exempt. Under the conditions of a felling licence, the licensee is required to satisfy a range of good forest practise standards published by the Forest Service, including biodiversity conservation. The Forest Service sets out Forest Biodiversity Guidelines.
Forestry Regulations 2017	
Forest Biodiversity Guidelines ⁹³	Any grassland within a SAC or SPA be designated as highly biodiverse grassland. These areas of high biodiversity will therefore be covered under European Communities (Birds and Natural Habitats) Regulations 2011.
	Wildlife habitats are protected under Wildlife Act 1976 .
Section 26 and 27 of the Forestry Act 2014	Section 26 and 27 of the Forestry Act 2014 describe offences under the Act and the penalties that can be imposed by the Courts. Penalties for illegal tree felling, breach of felling licence conditions or failure to reforest in accordance with a replanting order vary by type of offence.
	Section 67 of the European Communities (Birds and Natural Habitats) Regulations 2011 sets out penalties for contravention to the statute.
	Section 74 of the Wildlife Act 1976 sets out penalties for contravention to the statute.

Please note that in the assessments as described above, we have only reviewed if the requested sub-criteria is covered by the legislation, not if the legislation is effective and rolled out in such a way to actually achieve its objective. We are however aware of discussions⁹⁴ on the 'suitability' of the setting of the annual allowable cut in Russia for example, used to actually maintain long term production capacity. However, since the legislation is present together with an enforcement system, the sub-criteria was considered as met in this case, within the aforementioned boundaries of this legal assessment. The quality of the methodology to come to the actual allowable cut numbers are beyond the scope of this assessment.

Examples on the broader assessment of enforcement beyond the relevant legislation:

Ukraine:

- Following the comments in the UNEP-WCMC briefing notes:
 - "Following publication of the Earthsight report in July 2018 and the EU TAIEX expert mission report in October 2018, Ukraine has taken steps to address illegalities in the forestry sector and the Ukrainian Prime Minister vowed to strengthen enforcement to fight **illegal logging** and timber trade. Ukrainian forestry reforms that would allow for **independent enforcement of Ukraine's forestry laws** and **increased transparency** have been approved by the Ukrainian cabinet of ministers, however Earthsight note that this key package of reforms has apparently stalled, as it awaits sign-off from the Prime Minister."⁹⁵
 - "On 14 July, Earthsight published findings from a two-year investigation into illegal logging and **timber corruption** in Ukraine. The report detailed extensive corruption throughout the timber supply chain from the government-owned State Forestry Enterprises (SFEs) to their superiors within the country's forest administration. An extrapolation from field investigations indicates that ~40% of timber being produced is illegally cut, through misuse of a loophole designed to prevent the spread of disease."⁹⁶
 - "Regarding timber from Ukraine, it was concluded that the country as a whole should be considered a **risk country of harvest**, requiring the provision of adequate risk

⁹³ <https://www.agriculture.gov.ie/media/migration/forestry/publications/biodiversity.pdf>

⁹⁴ <http://www.hcvf.ru/ru/projects/neistoshhitelnost-lesopolzovaniia> ; http://www.spb-niilh.ru/pdf/O_lesoustroistve.pdf

⁹⁵ https://ec.europa.eu/environment/forests/pdf/EUTR_Briefing_note_July-August_2019_final.pdf

⁹⁶ https://ec.europa.eu/environment/forests/pdf/Briefing_note_June_-_August_2018_Public.pdf

mitigating measures. In cases where a negligible risk assessment cannot be reached, timber from Ukraine should not be placed on the EU market.”⁹⁷

- The text from the briefing notes clearly refer to issues with enforcement in the timber sector beyond only legality and therefore a ‘NO’ on all five sustainable harvesting criteria for enforcement is set.

Romania:

- The infringement procedure as well as the briefing notes comment:
 - “The Commission is urging **Romania** to properly implement the [EU Timber Regulation](#) (EUTR), which prevents timber companies from producing and placing on the EU market products made from **illegally harvested logs**. In the case of Romania, the national authorities have been unable to effectively check the operators and apply appropriate sanctions. Inconsistencies in the national legislation do not allow Romanian authorities to check large amounts of illegally harvested timber. In addition, the Commission has found that the Romanian authorities manage forests, including by authorising logging, without evaluating beforehand the impacts on **protected habitats** as required under the Habitats Directive and Strategic Environmental Assessment Directives. Furthermore, there are shortcomings in the access of the public to **environmental information** in the forest management plans. The Commission also found that protected forest habitats have been lost within protected Natura 2000 sites in breach of the **Habitats and Birds Directives**. Therefore, the Commission decided today to send a letter of formal notice to Romania, giving it one month to take the necessary measures to address the shortcomings identified by the Commission. Otherwise, the Commission may decide to send a reasoned opinion to the Romanian authorities“
- The text from the infringement procedure refers to issues beyond legality and therefore a ‘NO’ has been set on enforcement for legality, protected areas and biodiversity.

Please note that for the assessment of enforcement, we have relied on sources specific to the forestry sector (e.g. corruption indexes cover a variety of sector sometimes leading to misinterpretations). Additionally, the Commission requested only to include international governmental sources for the assessment of enforcement, so no NGO or private related sources or database were taken into account as part of this assessment.

In the following table we present an overview of date on which the country sheet was produced, as well as the expert who contributed to them.

Table 20. Country sheet dates and contributing experts

Name country sheet	Date of completion/latest edit	Project partner	Country expert
Austria	12.06.2020	EFI	Blasius Schmidt
Belgium	12.06.2020	EFI	Jo van Brusselen
Bulgaria	15.04.2020	IEEP	Tsvetelina Filipova
Cyprus	16.04.2020	Navigant	Anastasia Kostakou
Czech Republic	14.04.2020	Navigant	Jan Cihlar
Denmark	12.06.2020	IEEP	Thorfinn Stainforth
The Netherlands	06.04.2020	Navigant	Gilles Dillen
Estonia	12.06.2020	OEKO	Hannes Böttcher
Finland	09.04.2020	EFI	Wenla Vallius
France	30.04.2020	IEEP	Anne Marechal
Germany	12.06.2020	OEKO	Hannes Böttcher
Greece	16.04.2020	Navigant	Anastasia Kostakou
Croatia	10.04.2020	EFI	Nenad Simunovic
Hungary	14.04.2020	IEEP	Petra Stankovics
Ireland	12.06.2020	Navigant	Cara Merusi
Italy	12.06.2020	IEEP	Anastasia Giadrossi

⁹⁷ https://ec.europa.eu/environment/forests/pdf/EUTR_Briefing_note_July-August_2019_final.pdf

Name country sheet	Date of completion/latest edit	Project partner	Country expert
Luxemburg	28.04.2020	EFI	Jo van Brusselen
Latvia	24.04.2020	Navigant	Andis Lazdiņš
Lithuania	14.04.2020	Navigant	Gediminas Jasinevicius
Malta	15.04.2020	Navigant	Anna Pulo
Poland	03.04.2020	Navigant	Artur Lenkowski
Portugal	23.04.2020	EFI	Mariana Hassegawa
Romania	12.06.2020	Navigant	Laura Bouriaud
Slovenia	12.06.2020	Navigant	Danijel Crnčec
Slovakia	10.04.2020	Navigant	Jan Karaba
Spain	12.06.2020	EFI	Mercedes Rois
Sweden	21.04.2020	IIEP	Mia Pantzar
Belarus	12.06.2020	Navigant	Rens Hartkamp
Canada – British Columbia	30.04.2020	Navigant	Lucie Pfaltzgraff
Canada – Quebec	12.06.2020	Navigant	Lucie Pfaltzgraff
Russia	12.06.2020	Navigant	Rens Hartkamp
Ukraine	12.06.2020	Navigant	Georgiy Geletukha
USA - North Carolina	29.04.2020	SIG	John Gunn/Thomas Buchholz
USA - North Carolina	29.04.2020	SIG	John Gunn/Thomas Buchholz

B.2. Results country sheets

In the following section we present the resulting country sheets as developed within the REDIIBIO project.



Background information

Land area	8.25 million hectares ¹
Forest area	3.87 million hectares, 46.9%
Protected forests and forests under Natura 2000	834,770 hectares ²
Wood fuel production	5,243,220 m ³ ³
Wood fuel export	20,650 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Austria	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?		
	<ol style="list-style-type: none"> Allgemeines bürgerliches Gesetzbuch (General Civil Code) ABGB of 1812, § 405⁴ Vermessungsgesetz (land register, legally gazetted boundaries) VermG of 1968⁵ Forstgesetz (Austrian forest law) ForstG of 1975, §§ 17-19; 25 (1); 80-92; 174 (3) b) 3.⁶ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁷	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{7,8}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{7,9,10}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?		
	1. Forstgesetz (Austrian forest law) ForstG of 1975, §§ 13; 16 (2)c; 17a (4); 65 (2); 89; 172 (6)a; 174 (1) a) 1, 3, 6a ⁷		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁷	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁷	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{7,10}	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?		
	1. Wasserrechtsgesetz (Austrian water rights act) of 1959, National law, §§ 30 (1) 2-4; 55 (1)1a ¹¹ Nature conservation is primarily the responsibility of the federal states. As a result, nature conservation laws for each federal states have been identified as part of the regional assessment.		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹¹	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹¹	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹¹	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?		

	1. Forstgesetz (Austrian forest law) ForstG of 1975, §§ 16 (2)b; 38; 58(3)a; 60 ⁷	
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁷
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{7,12,13}
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁷
7	Maintenance of biodiversity to minimize negative impact	Yes ⁷
7.1	Law name and date?	- (specified at regional competence)
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁷ (specified at regional competence)
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁷ (specified at regional competence)
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁷ (specified at regional competence)
8	Maintenance and improvement of long-term production capacity	Yes
8.1	Law name and date?	
	1. Forstgesetz (Austrian forest law) ForstG of 1975, §§ 16 (2)a; 82 (1) a)1; 173 (2)b ⁷	
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁷
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{7,12,13}
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁷

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹⁴	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹⁵	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹⁶	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=AUT>, 2016 values

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10001622>

⁵ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10011400>

⁶ <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC089288/>

⁷ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10010371>

⁸ <http://www.wald-in-oesterreich.at/schutz-vor-illegalem-holzeinschlag/?context=C%2311%23AC%235127>

⁹ The Federal Office of Forests (Bundesamt für Wald (BFW)): <https://bfw.ac.at/rz/bfwcms.web?dok=9390>

¹⁰ The Austrian Forest Law (ForstG): <https://www.bmlrt.gv.at/forst/oesterreich-wald/Forstrecht/Forstgesetz.html>

¹¹ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10010290>

¹² <https://bfw.ac.at/rz/bfwcms.web?dok=4256>

¹³ <https://www.umweltbundesamt.at/boris>

¹⁴ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

¹⁵ <https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=AUT>

¹⁶ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Austria%20First/LV-03-06-EU%20INDC.pdf>



Background information

Land area	3.03 million hectares ¹
Forest area	0.68 million hectares, 22.5%
Protected forests and forests under Natura 2000	47,900 hectares ²
Wood fuel production	892,750 m ³ ³
Wood fuel export	32,140 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Belgium	
2	Is forestry policy/legislation of national or regional competence?	Regional competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?		
	<ol style="list-style-type: none"> 1. EU Timber Regulation⁴ 2. Forest decree of 13/06/1990⁵ 3. Nature decree of 21/10/1997⁶ 4. Decree on spatial planning of 15/05/2009⁷ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{8,5,6}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{9,5,6}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{10,5,6}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes- covered at a regional level	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes- covered at a regional level	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes- covered at a regional level	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes- covered at a regional level	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes- covered at a regional level	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes- covered at a regional level	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes- covered at a regional level	

6.3	Is there a monitoring system in place related to the law(s) above?	Yes- covered at a regional level	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes- covered at a regional level	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes- covered at a regional level	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes- covered at a regional level	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes- covered at a regional level	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes- covered at a regional level	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes- covered at a regional level	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes- covered at a regional level	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹¹	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹²	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹³	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=BEL>

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ [http://www.fao.org/faostat/en/wood_fuel_production_and_export_\(2018\)](http://www.fao.org/faostat/en/wood_fuel_production_and_export_(2018))

⁴ <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32010R0995>

⁵ <https://codex.vlaanderen.be/Zoeken/Document.aspx?DID=1003183¶m=inhoud>

⁶ <https://codex.vlaanderen.be/Zoeken/Document.aspx?DID=1005915¶m=informatie>

⁷ <https://codex.vlaanderen.be/portals/codex/documenten/1018245.html>

⁸ <https://www.health.belgium.be/nl/controles-op-hout>

⁹ SWD(2019) 112 final. COMMISSION STAFF WORKING DOCUMENT, The EU Environmental Implementation Review 2019. Country Report – BELGIUM: https://ec.europa.eu/environment/eir/pdf/report_be_en.pdf

¹⁰ List of EUTR competent authorities in EU Member States: https://ec.europa.eu/environment/forests/pdf/list_competent_authorities_eutr.pdf

¹¹ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

¹² <https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=BEL>

¹³ https://www.climat.be/files/4214/9880/5755/NAP_EN.pdf



Background information

Land area	10.86 million hectares ¹
Forest area	3.82 million hectares, 35%
Protected forests and forests under Natura 2000	578,000 hectares ²
Wood fuel production	2,849,214 m ³ ³
Wood fuel export	174,484 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Bulgaria	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Law on forests of 2011⁴ 2. Ordinance of 2011 for logging in forests⁵ 3. Energy from Renewable Sources Act⁶ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{4,6}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{4,7,8}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁴	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Law on forests⁴ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁴	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁴	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Law on forests⁴ 2. Law on the protected territories of 1998⁹ 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{8,10}	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁴	
6	Maintenance of soil quality to minimize negative impact	Yes	

6.1	Law name and date?	(see below)	
	1. Law on forests ⁴ 2. Law on soils ¹¹		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁴	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁴	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	1. Law on forests ⁴ 2. Law on Biodiversity of 2002 ¹²		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{4,13}	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁴	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁴	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	(see below)	
	1. Law on forests ⁴		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{14,15}	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{14,15}	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁴	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹⁶	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹⁷	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹⁸	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=BGR>, 2016 values

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ <http://extwprlegs1.fao.org/docs/pdf/bul187842.pdf>

⁵ <http://www.iag.bg/docs/lang/1/cat/3/index>

⁶ <https://me.government.bg/bg/library/energy-from-renewable-sources-act-167-c25-m258-1.html>

⁷ Annual report for the state and development of the agriculture:

https://www.mzh.government.bg/media/filer_public/2019/11/29/agraren_doklad_2019.pdf

⁸ Rules of regulation of the Executive Forestry Agency:

http://www.iag.bg/data/docs/USTROJSTVEN_PRAVILNIK_IAG.pdf

⁹ <http://www.iag.bg/docs/lang/1/cat/1/index>

¹⁰ Directorate on National Parks: <http://extwprlegs1.fao.org/docs/pdf/bul187842.pdf>

¹¹ <https://www.lex.bg/laws/ldoc/2135569762>

¹² <https://www.ecolex.org/details/legislation/biological-diversity-act-lex-faoc040293/>

¹³ Regulation No. 1 of 2012 on the control and protection of forest territories:

https://www.mzh.government.bg/media/filer_public/2019/11/19/naredba_1_ot_30012012_g_za_kontrola_i_opazvaneto_na_gorskite_teritorii-1.pdf

¹⁴ National Forestry Accounting Plan of Bulgaria, including Forest Reference Levels for the period 2021-2025:

https://www.moew.government.bg/static/media/ups/tiny/NFAP_final_EN.pdf

¹⁵ Regulation No. 8 of 2011 on logging in forests: <http://www.iag.bg/docs/lang/1/cat/3/index>

¹⁶ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

¹⁷ <https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx>

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Background information

Land area	5.66 million hectares ¹
Forest area	1.92 million hectares, 34% ¹
Protected forests and forests under Natura 2000	320,000 hectares ²
Wood fuel production	2,170,639 m ³ ¹
Wood fuel export	612,740 m ³ ¹

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Croatia	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	see below	
	<ol style="list-style-type: none"> 1. Law on forests (Zakon o šumama (NN 68/18, 115/18, 98/19) of 2018, Articles 8(1), 28(3), 36(1), 38(1) (13.7.2018)³ 2. Pravilnik o doznaci stabala, obilježbi šumskih proizvoda, teretnom listu (popratnici) i šumskom redu (NN 71/19) (printed 26.7.2019.) Ordinance on selection of trees for harvest, labeling of forest products, encumbrance sheet⁴ 3. Pravilnik o uređivanju šuma (NN 68/18) (printed 2.11.2018.) (Ordinance on forest inventory and management planning)⁵ 4. Biodiversity provisions and other environmental protection measures related to forest harvest are regulated by: Zakon o zaštiti okoliša (NN 80/13., 153/13., 78/15, 12/18, 118/18, in force 01.01.2019.) (Law on environmental protection)⁶ 5. Pravilnik o popisu stanišnih tipova, karti staništa te ugroženim i rijetkim stanišnim tipovima (NN88/2014, printed 23.7.2014.) (Ordinance on the list of habitat types, habitat maps and endangered and rare habitat types)⁷ 6. Pravilnik o čuvanju šuma (NN 28/15, printed 13.3.2015.) (Ordinance on forest safe keeping)⁸ 7. Pravilnika o vrsti šumarskih radova, minimalnim uvjetima za njihovo izvođenje te radovima koje šumoposjednici mogu izvoditi samostalno (NN 16/15, printed 11.2.2015.) (Ordinance on types of silvicultural and forest harvesting activities, minimal conditions for their implementation and activities that private forest owners may perform themselves)⁹ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{3,8,10,11,12,13,14}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{3,15,16,17,18,19}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{3,15,20,21,22}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	see below	
	<ol style="list-style-type: none"> 1. Law on forests of 2019 (Zakon o šumama, 13.7.2018, (NN 68/18, 115/18, 98/19)³ 2. Article 19, 29, 30,40 of Ordinance on forest inventory and management planning (Pravilnik o uređivanju šuma (NN 68/18), printed 2.11.2018)²³ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{3,15}	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{3,15,22}	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{3,15,22}	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?		

#	Criteria	Is the criteria embedded? How?	Comments
	<ol style="list-style-type: none"> 1. Zakon o zaštiti okoliša (NN 80/13., 153/13., i 78/15.) (enforced since 01.01.2019) (Law on environment protection)²⁴ 2. Pravilnik o popisu stanišnih tipova, karti staništa te ugroženim i rijetkim stanišnim tipovima (NN 88/14) (Ordinance on the list of habitat types, maps of habitats and endangered and rare habitat types)²⁵ 3. Uredba o ekološkoj mreži (NN124/2013) (Directive on ecological network) ²⁶ 4. Konvencija o zaštiti svjetske kulturne i prirodne baštine (Pariz, 1972.) – Notifikacija o sukcesiji (NN 12/93.) (Convention Concerning the Protection of the World Cultural and Natural Heritage -notification on succession)²⁷ 5. Konvencija o močvarnim staništima koja su od međunarodnog značenja naročito kao staništa ptica močvarica (Ramsar, 1971.) – Notifikacija o sukcesiji (NN – Međunarodni ugovori broj 12/93.) (Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat)²⁸ 6. Konvencija o biološkoj raznolikosti (Rio de Janeiro, 1992) – Zakon o potvrđivanju ("Narodne novine" – Međunarodni ugovori, broj 6/96.) (Convention on biodiversity, Rio de Janeiro, 1992)²⁹ 7. Konvencija o zaštiti europskih divljih vrsta i prirodnih staništa (Bern, 1979.) – Zakon o potvrđivanju (NN – Međunarodni ugovori, broj 6/00.) (Convention on the Conservation of European Wildlife and Natural Habitats (1979), or Bern Convention)³⁰ 8. Konvencija o europskim krajobrazima (Firenza, 2000) – Zakon o potvrđivanju (NN– Međunarodni ugovori, broj 12/02.) (European Landscape Convention of the Council of Europe - ratification law)³¹ 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{15,24}	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{15, 24, 32, 33}	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{15, 24}	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?		
	<ol style="list-style-type: none"> 1. Law on forests (Zakon o šumama, 13.7.2018, (NN 68/18, 115/18, 98/19), article 4, 9, 10, 48 § 1³⁴ 2. Zakon o zaštiti okoliša (NN 80/13, 153/13, 78/15, 12/18, 118/18), article 11- paragraph 2, article 21- paragraph 1 and 2, article 22 (enforced since 01.01.2019) (Law on environmental protection)³⁵ 		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{3, 36, 15}	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{3,15,36}	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?		
	<ol style="list-style-type: none"> 1. Zakon o šumama (13.7.2018),(NN 68/18, 115/18, 98/19, Article 3- paragraph 2, Articles 9 and 10 (Law on forests)³⁴ 2. Zakon o zaštiti okoliša (NN 80/13, 153/13, 78/15, 12/18, 118/18) article 3- paragraph 1, article 4- paragraph 33, article 7- paragraph 1, Article 10- paragraph 7, Article 11 (enforced since 01.01.2019) (Law on environmental protection)³⁵ 		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{15, 24, 34}	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{15, 24,37, 38}	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{15, 24, 34}	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?		
	<ol style="list-style-type: none"> 1. Pravilnik o uređivanju šuma (NN 79/15 i 97/18) (printed 2.11.2018.), articles 31-35 (Ordinance on forest management planning)³⁹ 2. Law on forests (Zakon o šumama, 13.7.2018, (NN 68/18, 115/18, 98/19), article 3- paragraph 2, article 9, and article 27²³ 		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{3, 15}	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{3, 15, 22}	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{3, 15}	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ⁴⁰	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ⁴¹	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ⁴¹	

¹ <http://www.fao.org/faostat/en/>, land use and forest area (2016), wood fuel production and export (2018)

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ Croatian law on forests: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC185214>; https://narodne-novine.nn.hr/clanci/sluzbeni/2018_07_68_1392.html

⁴ https://narodne-novine.nn.hr/clanci/sluzbeni/2019_07_71_1506.html

⁵ https://narodne-novine.nn.hr/clanci/sluzbeni/2018_11_97_1875.html

⁶ <https://www.zakon.hr/z/194/Zakon-o-zaštiti-okoliša>

⁷ https://narodne-novine.nn.hr/clanci/sluzbeni/2014_07_88_1782.html

⁸ https://narodne-novine.nn.hr/clanci/sluzbeni/2015_03_28_595.html

⁹ https://narodne-novine.nn.hr/clanci/sluzbeni/2015_02_16_302.html

¹⁰ https://narodne-novine.nn.hr/clanci/sluzbeni/2018_12_115_2243.html

¹¹ https://narodne-novine.nn.hr/clanci/sluzbeni/2015_03_28_595.html

¹² UNEP-WCMC website, Chatham House portal dedicated to forest governance: <https://forestgovernance.chathamhouse.org/>

¹³ Public data on state forest inspectorate: <https://net.hr/danas/crna-kronika/sumarski-inspektor-uzeo-mito-od-vlasnika-pilane-nikada-vise-nece-smjeti-raditi-za-drzavu/>

¹⁴ <http://drustvomarjan.hr/wp-content/uploads/2020/03/24.10.19.-Izvje%C5%A1%C4%87e-Dr%C5%BEavnog-inspektorata.pdf>

¹⁵ Law on state forest inspectorate (NN115/18): https://narodne-novine.nn.hr/clanci/sluzbeni/2018_12_115_2243.html

¹⁶ https://narodne-novine.nn.hr/clanci/sluzbeni/2015_03_28_595.html

¹⁷ Chatham House portal dedicated to forest governance: <https://forestgovernance.chathamhouse.org/>

¹⁸ <https://net.hr/danas/crna-kronika/sumarski-inspektor-uzeo-mito-od-vlasnika-pilane-nikada-vise-nece-smjeti-raditi-za-drzavu/>

¹⁹ <http://drustvomarjan.hr/wp-content/uploads/2020/03/24.10.19.-Izvje%C5%A1%C4%87e-Dr%C5%BEavnog-inspektorata.pdf>

²⁰ Ordinance on forest safe keeping: https://narodne-novine.nn.hr/clanci/sluzbeni/2015_03_28_595.html

²¹ Chatham House portal dedicated to forest governance: <https://forestgovernance.chathamhouse.org/>

²² Newspaper article: [https://www.jutarnji.hr/globus/Globus-politika/globus-otkriva-veliku-pljacku-sumskog-blaga-drვნa-mafija-u-ilegalnoj-sjeci-desetljeća-kriminalni-biznis-drzavi-se-odvija-pred-nosom/7991900](https://www.jutarnji.hr/globus/Globus-politika/globus-otkriva-veliku-pljacku-sumskog-blaga-drвна-mafija-u-ilegalnoj-sjeci-desetljeća-kriminalni-biznis-drzavi-se-odvija-pred-nosom/7991900)

²³ Ordinance on forest inventory and management planning: https://narodne-novine.nn.hr/clanci/sluzbeni/2018_11

²⁴ The law on environmental protection (NN 80/13, 153/13, 78/15, 12/18, 118/18): https://narodne-novine.nn.hr/clanci/sluzbeni/2018_12_118_2345.html

²⁵ https://narodne-novine.nn.hr/clanci/sluzbeni/full/2014_07_88_1782.html

²⁶ Directive on the ecological network: https://narodne-novine.nn.hr/clanci/sluzbeni/2013_10_124_2664.html

²⁷ https://narodne-novine.nn.hr/clanci/medunarodni/1993_10_12_27.html

²⁸ https://narodne-novine.nn.hr/clanci/medunarodni/1993_10_12_27.html

²⁹ https://narodne-novine.nn.hr/clanci/medunarodni/1996_05_6_39.html

³⁰ https://narodne-novine.nn.hr/clanci/medunarodni/full/2000_05_6_67.html

³¹ https://narodne-novine.nn.hr/clanci/medunarodni/2002_10_12_144.html

³² Strategy and the action plan for protection of biological and landscape diversity of Republic of Croatia: https://narodne-novine.nn.hr/clanci/sluzbeni/2017_07_72_1712.html

³³ Directive on information system for environmental protection: <http://www.propisi.hr/print.php?id=8181>

³⁴ Law on forests: https://narodne-novine.nn.hr/clanci/sluzbeni/2018_07_68_1392.html

³⁵ https://narodne-novine.nn.hr/clanci/sluzbeni/2013_06_80_1659.html

³⁶ Article 224 - 266 of the law on environmental protection: https://narodne-novine.nn.hr/clanci/sluzbeni/018_12_118_2345.html

³⁷ Strategy and the action plan for protection of biological and landscape diversity of Republic of Croatia: https://narodne-novine.nn.hr/clanci/sluzbeni/2017_07_72_1712.html

³⁸ Directive on information system for environmental protection (NN68/08): <http://www.propisi.hr/print.php?id=8181>

³⁹ Law on forests: https://narodne-novine.nn.hr/clanci/sluzbeni/2018_07_68_1392.html

⁴⁰ https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27

⁴¹ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Belgium%20First/LV-03-06-EU%20INDC.pdf>



Background information

Land area	924,000 hectares ¹
Forest area	172,700 hectares, 13.8%
Protected forests and forests under Natura 2000	26.41 thousand hectares ²
Wood fuel production	8,840 m ³ ¹
Wood fuel export	-1

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Cyprus	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	1. Forest Act ΝΟΜΟΣ Ν. 25(Ι)/2012 of 2012 ³		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ³	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ³	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ³	
4	Forest regeneration of harvested area	No	
4.1	Law name and date?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
4.2	Is there an enforcement system outlined in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
4.3	Is there a monitoring system in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	1. Forest Act ΝΟΜΟΣ Ν. 25(Ι)/2012 of 2012 ⁴		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁴	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁴	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	1. Forest Act ΝΟΜΟΣ Ν. 106(Ι)/2002 of 2002 ⁵		

6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁵	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	1. Forest Act ΝΟΜΟΣ Ν. 25(Ι)/2012 of 2012 ⁶		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁶	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁶	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁶	
8	Maintenance and improvement of long-term production capacity	No	
8.1	Law name and date?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
8.2	Is there an enforcement system outlined in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
8.3	Is there a monitoring system in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ⁷	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ⁸	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ⁸	

¹ <http://www.fao.org/faostat/en/>, land use and forest area (2016), wood fuel production and export (2018)

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ Forest Act, Article 33, shorturl.at/fsMW5

⁴ Forest Act, Article 65, shorturl.at/fsMW5

⁵ http://www.moa.gov.cy/moa/environment/environmentnew.nsf/page17_en/page17_en?OpenDocument

⁶ Forest Act, Article 19, shorturl.at/fsMW5

⁷ https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27

⁸ <https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=CYP>



Background information

Land area	7.72 million hectares ¹
Forest area	2.67 million hectares, 34.6% ¹
Protected forests and forests under Natura 2000	752 thousand hectares ²
Wood fuel production	4,246,000 m ³ ³
Wood fuel export	207,500 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Czech Republic	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	1. Forest Act No. 289 of 1995, § 7-9, 13, 24-27, 29-36, 46 ⁴ 2. Nature Conservation Law, No.114 of 1992, §34 ⁵		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{4,6}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{4,5,7,8,9}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4,5}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	1. Forest Act No. 289 of 1995, §24-25, 31-32 ⁴ 2. Decree No.139 of 2004, Decree on transfer of seeds and seedlings of forest species and records on reproductive material origin, and laying down rules on reforestation and afforestation of forest land ¹⁰		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{4,7,9,11}	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4,7}	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	1. Zákon České národní rady o ochraně přírody a krajiny, No.114 of 1992, §3 ⁵		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{5,12}	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,13}	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	1. Forest Act No. 289 of 1995, §13, 33 ⁴		

	2. Zákon České národní rady o ochraně přírody a krajiny, No.114 of 1992, §16, 26, 29 ⁵	
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{4,5}
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{4,5,9,13,14,15}
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4,5}
7	Maintenance of biodiversity to minimize negative impact	Yes
7.1	Law name and date?	(see below)
	1. Forest Act No. 289 of 1995, §8 ⁴ 2. Zákon České národní rady o ochraně přírody a krajiny, No.114 of 1992, §15, 26, 29 ⁵	
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{4,5}
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{4,5,11,16}
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4,5}
8	Maintenance and improvement of long-term production capacity	Yes
8.1	Law name and date?	(see below)
	1. Forest Act No. 289 of 1995, §24-25, 29, 31 ⁴	
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{4,9,11,14,15}
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁴

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹⁷	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹⁸	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹⁸	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=CZE>, 2016 values

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ Forest Act: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC088503>

⁵ Zákon České národní rady o ochraně přírody a krajiny, No.114 of 1992: <https://www.zakonyprolidi.cz/cs/1992-114?text=raseli>

⁶ Law No. 226 of 2013: <https://www.zakonyprolidi.cz/cs/2013-226>

⁷ Czech Article summarizing the monitoring system for timber harvesting: http://eagri.cz/public/web/mze/tiskovy-servis/tiskove-zpravy/x2011_posileny-kontrolni-system-lesu-cr.html

⁸ Additional information from the national forest management organization: <https://lesy-cr.cz/wp-content/uploads/2016/12/kontrolni-cinnost-lcr-v-pc-a-tc.pdf>

⁹ Data from forest management plans and outlines (Ministry of Agriculture): <http://eagri.cz/public/web/mze/>

¹⁰ Decree No.139 of 2004: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC074050>

¹¹ Additional information from Lesy CR (the national forest management organization)

<https://lesy-cr.cz/wp-content/uploads/2016/12/kontrolni-cinnost-lcr-v-pc-a-tc.pdf>

¹² Tools for protecting nature and landscapes (Ministry of the Environment):

[https://www.mzp.cz/web/edice.nsf/9BE7ACE92CCC839FC125708B001BB0F6/\\$file/planeta8_web.pdf](https://www.mzp.cz/web/edice.nsf/9BE7ACE92CCC839FC125708B001BB0F6/$file/planeta8_web.pdf)

¹³ Nature Conservation Agency (research and monitoring of the status of nature and landscapes):

<http://www.ochranaprirody.cz/pece-o-prirodu-a-krajinu/projekty-aopk-cr/vyzkum-a-sledovani-stavu-prirody-a-krajiny/>

¹⁴ Czech Research Institute for Forest Management: <https://www.vulhm.cz/monitoring-stavu-lesa/icp-forests/>

¹⁵ Monitoring methodology: <http://www.uhul.cz/images/poradenstvi/metodiky/HVLNPTAV.pdf>

¹⁶ Convention on Biological Diversity: <http://chm.nature.cz/umluva-o-biologicke-rozmanitosti-cbd/>

¹⁷ <https://www.un.org/sustainabledevelopment/blog/2016/04/parisagreementsingatures/>

¹⁸ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Czechia%20First/LV-03-06-EU%20INDC.pdf>



Background information

Land area	4 million hectares ¹
Forest area	0.61 million hectares, 15% ¹
Protected forests and forests under Natura 2000	123,710 hectares ²
Wood fuel production	2,061,100 m ³ ³
Wood fuel export	9,496 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Denmark	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Land Registration Law of 2014⁴ Forest Act of 2019⁵ Nature Protection Act of 2019⁶ EU Timber Regulation of 2012⁷ FSC Centralized National Risk Assessment for Denmark⁸ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{5,6,8}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁸	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁷	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Forest Act of 2019⁵ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁸	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁸	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁹	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Forest Act of 2019⁵ Nature Protection Act of 2019⁶ National Park Act of 2017¹⁰ Hunting and Wildlife Management Act of 2019¹¹ 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{5,6,8,10}	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{6,12}	

5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹³	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	1. Forest Act of 2019 ⁵ 2. Environmental Protection Act of 2019 ^{14,15}		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁴	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹⁴	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹¹	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	1. Forest Act of 2019 ⁵ 2. Nature Protection Act of 2019 ⁶		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{5,6,8}	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹⁶	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁶	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	(see below)	
	1. Forest Act of 2019 ⁵		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁸	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹¹	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹⁷	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹⁸	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹⁸	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=DNK> (2016 values)

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ <https://www.retsinformation.dk/forms/R0710.aspx?id=142900>

⁵ <https://www.retsinformation.dk/Forms/R0710.aspx?id=208359>

⁶ <https://www.retsinformation.dk/forms/r0710.aspx?id=155609>

⁷ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32010R0995>

⁸ <https://dk.fsc.org/preview.controlled-wood-risikoverdoring-danmark.a-1689.pdf>

⁹ <https://mst.dk/erhverv/skovbrug/lovgivning/fredskovspligten-og-tilsyn/>

¹⁰ <https://www.retsinformation.dk/Forms/R0710.aspx?id=186417>

¹¹ <https://www.retsinformation.dk/Forms/R0710.aspx?id=208198>

¹² <https://mst.dk/natur-vand/overvaagning-af-vand-og-natur/terrestriske-naturtyper-og-arter/>

¹³ <https://www.retsinformation.dk/Forms/R0710.aspx?id=208359>

¹⁴ <https://www.retsinformation.dk/Forms/R0710.aspx?id=210726>

¹⁵ Environmental Law in Denmark by Ellen Margrethe Basse, Chapter 6 - forests

¹⁶ <https://mst.dk/natur-vand/overvaagning-af-vand-og-natur/terrestriske-naturtyper-og-arter/>

¹⁷ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

¹⁸ <https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx>

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Background information

Land area	4.35 million hectares ¹
Forest area	2.23 million hectares, 51% ¹
Protected forests and forests under Natura 2000	553,997 hectares ²
Wood fuel production	3,500,000 m ³ ³
Wood fuel export	372,527 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Estonia	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	1. Forest Act of 2007 ⁴ 2. EU Timber Regulation of 2013 ⁵		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{6,7}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{6,8,9}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	1. Forest Act of 2007 ⁴		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁴	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4,8,9,10,11}	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	1. Nature Conservation Act of 2004 ¹²		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹²	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹²	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{9,12,13}	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	1. Forest Act of 2007 ⁴		

	2. Land Improvement Act of 2017 ¹⁴		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{9,15}	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{9,10,11}	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	1. Forest Act of 2007 ⁴ 2. Nature Conservation Act of 2004 ¹²		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{9,15}	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{9,10,11}	
8	Maintenance and improvement of long-term production capacity	No	
8.1	Law name and date?	(see below)	
	1. Forest Act of 2007 ⁴ 2. Environment minister's decree on Environmental Inspectorate number 12 of 2008 ⁹ 3. Environmental Supervision Act of 2001 ¹⁶ 4. Estonian Forestry Development Plan until 2020 ¹⁷		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	No ⁹	No enforcement system specified in regulation covering this sub-criterion
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{15,18}	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁸	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹⁹	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁰	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²¹	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=EST>

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ [http://www.fao.org/faostat/en/wood_fuel_production_and_export_\(2018\)](http://www.fao.org/faostat/en/wood_fuel_production_and_export_(2018))

⁴ <https://www.riigiteataja.ee/en/eli/504092017014/consolide>

⁵ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0074&from=en>

⁶ Forest Act: <https://www.riigiteataja.ee/en/eli/504092017014/consolide>

⁷ Forest survey website: <https://veebiaandmebaas.keskkonnaagentuur.ee/PXWeb/pjweb/et/?rxid=112d58b5-4eb7-4e92-9191-0d8c28ad8e44>

⁸ Environmental Board: <https://www.keskkonnaamet.ee>

⁹ Environmental Inspectorate: <https://www.kki.ee>

¹⁰ Forest Register: <https://register.metsad.ee>

¹¹ Forest notification portal: <https://www.keskkonnaamet.ee/en/activities/forestry/forest-notification>

¹² <https://www.riigiteataja.ee/en/eli/508112013010/consolide>

¹³ Estonian Nature Information System: <http://www.eelis.ee/>

¹⁴ <https://www.riigiteataja.ee/en/eli/504092015003/consolide>

¹⁵ Yearbook of environmental law violations: <https://www.kki.ee/et/aastaraamatud>

¹⁶ <https://www.riigiteataja.ee/en/eli/506102014001/consolide>

¹⁷ <https://www.riigiteataja.ee/akt/318022011003>

¹⁸ Forestry Development Plan: <https://www.envir.ee/et/eesmargid-tegevused/metsandus/metsanduse-arengukava-aastateks-2021-2030>

¹⁹ <https://unfccc.int/node/61061>

²⁰ <https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=EST>

²¹ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sweden%20First/EU%20First%20NDC.pdf>

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Background information

Land area	30.4 million hectares ¹
Forest area	22.2 million hectares, 73% ¹
Protected forests and forests under Natura 2000	4.22 million hectares ²
Wood fuel production	7,758,731 m ³ ³
Wood fuel export	119,957 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Finland	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	Forest Act 1093 of 1996, Chapter 2 and 3 amended and proclaimed in 2013 (number 1085) ^{4,5}		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{5,6}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,7,8,9}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{5,10}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forest Act 1093 of 1996, Chapter 2 amended and proclaimed in 2013 (number 1085), sections 5 a § and 8 §.^{5,11} 2. Government decree on sustainable use and management of forests number 1308 of 2013, sections 8 § and 8 a §. 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{5,6}	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,7,8,9}	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{5,10}	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forest Act number 1093 of 1996, Chapters 3 and 4 amended and proclaimed in 2013 (number 1085)⁴ 2. Nature Conservation Act number 1096 of 1996¹² 3. Wilderness Act number 62 of 1991, Section 7¹³ 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{5,6,9}	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,7,8,9,14}	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{5,10,15}	

6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	1. Forest Act number 1093 of 1996, Chapter 3 amended and proclaimed in 2013 (number 1085), section 10 a § ¹⁶ 1. Government decree on sustainable use and management of forests number 1308 of 2013 ¹⁷		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{5,6,9}	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,9}	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{5,10}	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	1. Forest Act number 1093 of 1996, Chapter 3 amended and proclaimed in 2013 (number 1085) ¹⁶ 2. Government decree on sustainable use and management of forests number 1308 of 2013 ¹⁷		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{5,6,9}	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,9,18}	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{5,10}	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	(see below)	
	1. Forest Act number 1093 of 1996, Section 1 ⁵ 2. Government decree on sustainable use and management of forests number 1308 of 2013 ¹⁷ 3. Act on Natural Resources Statistics number 562 of 2014, Section 2 ^{19,20,21}		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{5,6,9}	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ²²	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{5,10,19}	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ^{23,24}	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁵	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁵	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=FIN>, 2016 values

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ Forest Act 1093/1996: <http://extwprlegs1.fao.org/docs/pdf/fin11641E.pdf>

⁵ Original Forest Act: Metsälaki 1093/1996: <https://www.finlex.fi/fi/laki/ajantasa/1996/19961093#a20.12.2013-1085>

⁶ Penal Code: <https://www.finlex.fi/fi/laki/ajantasa/1889/18890039001>.

⁷ Statistics about monitoring the forest act: <https://www.metsakeskus.fi/metsakeskuksen-lainvalvontatilastot>.

⁸ Information about satellite imaging: <https://www.metsakeskus.fi/content/uusi-seurantamenetelma-tehostaa-ja-parantaa-metsalain-valvontaa>.

⁹ Decree of the Ministry of Agriculture and Forestry on supervision and monitoring by the Finnish Forestry Centre and Countryside Agency of compliance with forest laws and the reporting of verification results (No. 1 of 2012): <https://www.finlex.fi/fi/viranomaiset/normi/400001/38878>

¹⁰ Act on the Finnish Forestry Centre 6.5.2011/418: <https://www.finlex.fi/fi/laki/ajantasa/2011/20110418>

¹¹ Supplementing: Government decree on sustainable use and management of forests 30.12.2013/1308:

<https://www.finlex.fi/fi/laki/ajantasa/2013/20131308>

¹² Nature Conservation Act: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC012009>;

<https://www.finlex.fi/fi/laki/ajantasa/1996/19961096>

¹³ Wilderness Act: <https://www.finlex.fi/fi/laki/ajantasa/1991/19910062>

¹⁴ LiDAR: <https://www.metsakeskus.fi/uutiset/metsavaratiedon-inventointimenetelma-uudistuu-ensi-vuonna>

¹⁵ Act on Metsähallitus 234/2016: <https://www.finlex.fi/fi/laki/alkup/2016/20160234>

¹⁶ Forest Act: <https://www.finlex.fi/fi/laki/ajantasa/1996/19961093>.

¹⁷ Government decree on sustainable use and management of forests 30.12.2013/1308: <https://www.finlex.fi/fi/laki/ajantasa/2013/20131308>

¹⁸ Online service for mapping the habitats of special importance according to Forest Act: <https://www.metsaan.fi/karttapalvelut>

¹⁹ Act on Natural Resources Statistics (562/2014): <https://www.finlex.fi/fi/laki/alkup/2014/20140562>

²⁰ Act on National Resources Institute Finland 561/2014: <https://www.finlex.fi/fi/laki/alkup/2014/20140561>

²¹ National Resources Institute Finland (Luke) information on felling potential estimates: <https://www.luke.fi/en/natural-resources/forest/forest-resources-and-forest-planning/felling-potential-estimates/>

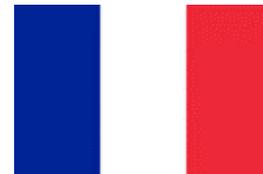
²² National Resources Institute Finland (Luke) information on forest resources, annual increment and harvesting levels:

<https://www.luke.fi/en/natural-resources/forest/forest-resources-and-forest-planning/forest-resources/>

²³ Paris Agreement: shorturl.at/kIAQ5

²⁴ Climate Act: <https://www.finlex.fi/fi/laki/ajantasa/2015/20150609>

²⁵ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Finland%20First/LV-03-06-EU%20INDC.pdf>



Background information

Land area	54.76 million hectares ¹
Forest area	16.99 million hectares, 31% ¹
Protected forests and forests under Natura 2000	6,179,990 hectares ²
Wood fuel production	23,661,810 m ³ ³
Wood fuel export	584,337 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	France	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Forest Code⁴ Ordonnance n° 2012-92 of 2012 relating to the legislative part of the Forest Code⁵ Law n° 2014-1170 of 2014 on the future of agriculture, food and forests⁶ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{4,5,7}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{8,9,10}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4,5}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Forest Code⁴ Ordonnance n° 2012-92 of 2012 relating to the legislative part of the Forest Code⁵ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{4,5}	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{4,5}	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4,5}	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Environment Code, Livre III¹¹ Forest Code⁴ Law 2016-1087 of 2016 on biodiversity, nature and landscapes¹² 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹¹	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹³	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{14,15}	

6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	1. Forest Code ⁴ 2. Ordonnance n° 2012-92 of 2012 relating to the legislative part of the Forest Code ⁵ 3. Law n° 2014-1170 of 2014 on the future of agriculture, food and forests ⁶		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁶	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{17,18}	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁴	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	1. Forest Code ⁴ 2. Ordonnance n° 2012-92 of 2012 relating to the legislative part of the Forest Code ⁵		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁶	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{19,20}	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4,21}	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	(see below)	
	1. Forest Code ⁴ 2. Ordonnance n° 2012-92 of 2012 relating to the legislative part of the Forest Code ⁵		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁶	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ²²	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4,21}	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ²³	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁴	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁴	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=FRA>

² https://appso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ [http://www.fao.org/faostat/en/wood_fuel_production_and_export_\(2018\)](http://www.fao.org/faostat/en/wood_fuel_production_and_export_(2018))

⁴

⁵ https://www.legifrance.gouv.fr/affichCode.do;jsessionid=25AD00CBEE6CF840D10890E52466249F.tplgr25s_2?cidTexte=LEGITEXT000025244092&dateTexte=20120701

⁶ https://www.legifrance.gouv.fr/affichTexte.do;jsessionid=25AD00CBEE6CF840D10890E52466249F.tplgr25s_2?cidTexte=JORFTEXT000025213462&dateTexte=20120127

⁷ https://www.legifrance.gouv.fr/affichTexteArticle.do;jsessionid=690D1837AFBF3CC2A74F14C8D20DA7D0.tplgr30s_3?cidTexte=JORFTEXT000029573022&idArticle=LEGIARTI000029575229&dateTexte=20141015

⁷ <http://www.isere.gouv.fr/Politiques-publiques/Agriculture-foret-et-developpement-rural/Foret/Principales-reglementations-forestieres/3-Coupes/Les-sanctions>

⁸ <http://observatoire.franceboisforet.com/>

⁹ <https://agreste.agriculture.gouv.fr/>

¹⁰ www.onf.fr

¹¹

https://www.legifrance.gouv.fr/affichCode.do;jsessionid=AD2844F731CD0883A5B2EA585CF3B929.tplgr30s_3?cidTexte=LEGITEXT000006074220&dateTexte=20200409

¹²

https://www.legifrance.gouv.fr/affichTexteArticle.do;jsessionid=196B0EDA2AFEE44EAC9627A9413B8469.tplgr25s_2?cidTexte=JORFTEXT000033016237&idArticle=LEGIARTI000033018598&dateTexte=20160809

¹³ <https://ofb.gouv.fr/gerer-et-restaurer-les-espaces-protoges>

¹⁴

https://www.legifrance.gouv.fr/affichCode.do;jsessionid=AD2844F731CD0883A5B2EA585CF3B929.tplgr30s_3?idSectionTA=LEGISCTA000006188386&cidTexte=LEGITEXT000006074220&dateTexte=20200409

¹⁵ <https://www.legifrance.gouv.fr/affichCode.do?idSectionTA=LEGISCTA000006188394&cidTexte=LEGITEXT000006074220&dateTexte=20200409>

¹⁶ Implementation of the national forest programme (PNFB):

<https://agriculture.gouv.fr/telecharger/84443?token=4b8096b95b488990df7a5711c98c62b2>

¹⁷ CNPF monitoring in private forests: <https://www.cnpf.fr/actualite/voir/959/le-sol-forestier-element-cle-pour-le-choix-des-essences-et-la-gestion-durable/n:170>

¹⁸ IGN monitoring: <https://inventaire-forestier.ign.fr/>

¹⁹ Plate-forme Biodiversité pour la Forêt (PBF): <https://agriculture.gouv.fr/foret-et-biodiversite>

²⁰

National Biodiversity Strategy: <https://www.ecologie-solidaire.gouv.fr/sites/default/files/Strat%C3%A9gie%20nationale%20pour%20la%20biodiversit%C3%A9%202011-2020.pdf>

²¹ Décret n° 2017-155 du 8 février 2017 portant approbation du programme national de la forêt et du bois:

<https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000034020467&dateTexte=&categorieLien=id>

²² National Forestry Accounting Plan of France: https://www.fern.org/fileadmin/uploads/fern/Documents/NFAP_France.pdf

²³ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

²⁴ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Austria%20First/LV-03-06-EU%20INDC.pdf>



Background information

Land area	34.94 million hectares ¹
Forest area	11.42 million hectares, 33% ¹
Protected forests and forests under Natura 2000	9,264,000 hectares ²
Wood fuel production	21,874,000 m ³ ³
Wood fuel export	138,742 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Germany	
2	Is forestry policy/legislation of national or regional competence?	Regional competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> National Forest Act of 1975⁴ Federal Nature Conservation Act of 1976⁵ Timber Trade Act- Administrative Regulation of 2013⁶ Timber Trade Act of 2011⁷ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁸	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁶	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁹	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> National Forest Act of 1975⁴ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁴	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes- covered at a regional level	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Federal Nature Conservation Act of 1976⁵ 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁵	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	
6	Maintenance of soil quality to minimize negative impact	Yes	

6.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> National Forest Act of 1975⁴ Federal Nature Conservation Act of 1976⁵ 		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁴	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁴	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	Yes- covered at a regional level	
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes- covered at a regional level	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{10,11}	Although the monitoring system is not deemed optimal, there is no severe evidence of lack of enforcement
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes- covered at a regional level	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> National Forest Act of 1975⁴ 		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{4,12}	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁴	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹³	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹⁴	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹⁵	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=GER>

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ [http://www.fao.org/faostat/en/wood_fuel_production_and_export_\(2018\)](http://www.fao.org/faostat/en/wood_fuel_production_and_export_(2018))

⁴ <https://www.gesetze-im-internet.de/bwaldg/BJNR010370975.html>

⁵ https://www.gesetze-im-internet.de/bnatschg_2009/

⁶ <https://www.bmel.de/SharedDocs/ExterneLinks/DE/Rechtsgrundlagen/National/HolzSiGVwV.html>

⁷ <http://www.gesetze-im-internet.de/holzsig/>

⁸ <http://www.gesetze-im-internet.de/holzsig/index.html#BJNR134500011BJNE000100000>

⁹ https://www.bmel.de/DE/Wald-Fischerei/Waldpolitik/_texte/InfoquellenEUHolzHandVO.html

¹⁰ https://www.gesetze-im-internet.de/bwaldg/_41a.html

¹¹ <https://dejure.org/gesetze/BNatSchG/31.html>

¹² Scenario study for assessing long-term production capacity: <https://www.bmel.de/SharedDocs/Downloads/Broschueren/Wald-Rohholzpotential-40Jahre.html;nn=310868>

¹³ <https://unfccc.int/node/180158>

¹⁴ <https://www4.unfccc.int/sites/ndcstaging/Pages/Party.aspx?party=DEU&prototype=1>

¹⁵ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sweden%20First/EU%20First%20NDC.pdf>



Background information

Land area	12.89 million hectares ¹
Forest area	4.05 million hectares, 31%
Protected forests and forests under Natura 2000	197,000 hectares ²
Wood fuel production	1,065,000 m ³ ¹
Wood fuel export	22,542 m ³ ¹

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Greece	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	1. Forest Act ΝΟΜΟΣ 998/1979 of 1979 ^{3,4}		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁵	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	1. Forest Act 4575/1998 of 1998 ⁶		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁶	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁶	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁶	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	1. Forest Act ΝΟΜΟΣ 3937/2011 of year 2011 ⁷		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁷	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁷	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁷	
6	Maintenance of soil quality to minimize negative impact	No	
6.1	Law name and date?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
6.2	Is there an enforcement system outlined in place related to the law(s) above?	No	No legislation found specifying an enforcement system covering this sub-criterion

6.3	Is there a monitoring system in place related to the law(s) above?	No	No monitoring system identified in legislation covering this sub-criterion
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
1. Forest Act ΝΟΜΟΣ 998/1979 of year 1979 Chapter C ⁸			
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁸	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁹	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁹⁹	
8	Maintenance and improvement of long-term production capacity	No	
8.1	Law name and date?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
8.2	Is there an enforcement system outlined in place related to the law(s) above?	No	No legislation found specifying an enforcement system covering this sub-criterion
8.3	Is there a monitoring system in place related to the law(s) above?	No	No monitoring system identified in legislation covering this sub-criterion
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹⁰	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹¹	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹²	

¹ <http://www.fao.org/faostat/en/>, land use and forest area (2016), wood fuel production and export (2018)

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.oikotechnics.org/greek_legislation_GR.html#_Toc90714143

⁴ <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC023635>

⁵ http://www.oikotechnics.org/greek_legislation_GR.html#_Toc90714180

⁶ <https://nomosphysis.org.gr/13649/ste-7132014-paraleipsi-ekdosis-apofasis-epi-aitimatos-eksagoras-i-apallotrisios-idiotikis-anadasoteas-ektasis/>

⁷ <https://www.e-nomothesia.gr/kat-periballon/n-3937-2011.html>

⁸ http://www.oikotechnics.org/greek_legislation.html#top_anchor

⁹ http://www.oikotechnics.org/greek_legislation.html#_Toc108250433

¹⁰ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

¹¹ <https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=GRC>

¹² <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Greece%20First/LV-03-06-EU%20INDC.pdf>



Background information

Land area	9.13 million hectares ¹
Forest area	2.07 million hectares, 22.7% ¹
Protected forests and forests under Natura 2000	874 thousand hectares ²
Wood fuel production	2,714,080 m ³ ³
Wood fuel export	163,291 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Hungary	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Act No. XXXVII of 2009 on forests, on the protection and management of forests⁴ Government Decree 433/2017. (XII, 21st) on Procedures for Certain Forest Authorities Procedures, Notifications and Official Registers 15§, 16§⁵ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁶	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,7}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{8,9,10}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	1. Act No. XXXVII of 2009 on forests, on the protection and management of forests. 51. §; §52 (2013) ⁴		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹¹	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{12,13,14}	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁵	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Act No. XXVI of 2003 on the National Land Use Plan¹⁶ National Strategy for the Conservation of Biodiversity of 2015¹⁷ Hungarian National Landscape Strategy (2017-2026)¹⁸ Act No. LIII of 1995 on the General Rules of Environmental Protection. (1995)¹⁹ 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ²⁰	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ²¹	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ²²	

6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	Act No. CXXIX of 2007 on the protection of arable land. ²³	
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ²⁴	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ²⁵	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{26,27}	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	1. Act No. XXXVII of 2009 on forests, on the protection and management of forests article 1. § b and 15 § (2) and 69. § (1) ⁴ 2. Parliamentary Decision No. 28/2015. on the National Strategy for the Conservation of Biodiversity 2015-2020 ²⁸		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{29,30,31}	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ³²	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	National Forest Strategy 2016-2030 ³³	
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁵	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ³⁴	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{35,36}	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ³⁷	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ³⁸	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ^{39,40}	
10.b.i	The country has national laws in place, applicable to the harvest area, to conserve and enhance carbon stock and sinks over the long term?		
10.b.ii	The country can provide evidence that reported LULUCF sector emissions to not exceed removal?		

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=HUN>, 2016 values

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ <http://www.fao.org/faostat/en/> wood fuel production and export (2018)

⁴ Act No. XXXVII of 2009 on forests, on the protection and management of forests: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC094026>

⁵ Government Decree 433/2017. (XII, 21st) <https://net.jogtar.hu/jogszabaly?docid=A1700433.KOR>

⁶ https://portal.nebih.gov.hu/iw/web/english/hungarian-forest-management/-/asset_publisher/pHBk9ppq6UNxK/content/introduction/forest-act

⁷ Decree of the Ministry of Agriculture: <https://net.jogtar.hu/jogszabaly?docid=A1700061.FM>

⁸ Forest Research Institute: <https://erti.naik.hu/en>

⁹ NÉBIH Division of European Timber Regulation (EUTR): <https://portal.nebih.gov.hu/-/faanyag-kereskedelmi-lanc-ellenorzes>

¹⁰ Centre for Ecological Research: https://www.okologia.mta.hu/en/forest_ecology

¹¹ <http://www.kormanyhivatal.hu/hu/ugytipusok-1/erdo-es-mezogazdasaggal-noveny-es-talajvedelemmel-kapcsolatos-ugyek/erdeszeti-ugyek/erdogazdalkodással-kapcsolatos-ugyek/tarvasag-erdefelujitasi-biztositek-nyujtasahoz-kotese>

- ¹² Database about forest regeneration: <https://portal.nebih.gov.hu/documents/10182/861593/FR2013.pdf/19cf04a0-1639-401f-a3fb-644755057d0d>
- ¹³ <http://extwprlegs1.fao.org/docs/texts/hun94026.doc&usg=AOvVaw0gea4NVnNwD-xHFaBBv8fo>
- ¹⁴ Forestry-related Databases of the Hungarian Forestry Directorate:
https://portal.nebih.gov.hu/documents/10182/862096/Forestry_related_databases.pdf/3ff92716-2301-4894-a724-72fafca9d4fc
- ¹⁵ <http://www.kormanyhivatal.hu/hu/szakigazgatasi-szervek/erdeszeti-igazgatóság>
- ¹⁶ Act No. XXVI of 2003 on the National Land Use Plan:
<http://www.fao.org/faolex/country-profiles/general-profile/en/?iso3=HUN;>
- ¹⁷ National Strategy for the Conservation of Biodiversity of 2015: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC181618;>
- ¹⁸ Hungarian National Landscape Strategy: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC163398;>
- ¹⁹ Act No. LIII of 1995 on the General Rules of Environmental Protection: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC006567>
- ²⁰ https://ec.europa.eu/environment/eir/pdf/report_hu_en.pdf
- ²¹ <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC181618>
- ²² <http://www.termesztvedelem.hu/index.php?lang=en>
- ²³ <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC097377>
- ²⁴ <https://www.uni-miskolc.hu/~agrarjog/ujzag/orszagjelentesangol.pdf>
- ²⁵ <http://en.foldhivatal.hu/content/view/84/121/>
- ²⁶ Directorate of Plant Protection and Soil Conservation: https://portal.nebih.gov.hu/ca/web/english/hungarian-forest-management/-/asset_publisher/pHBk9pq6UNxK/content/directorate-of-plant-protection-and-soil-conservation/contacts
- ²⁷ Official Portal of the Hungarian Land Administration: <http://en.foldhivatal.hu/content/view/3/4/>
- ²⁸ Parliamentary Decision: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC163398>
- ²⁹ National Strategy for the Conservation of Biodiversity in 2015-2020: <https://www.cbd.int/doc/world/hu/hu-nbsap-v2-en.pdf>
- ³⁰ National Biodiversity Monitoring System 2007: http://www.termesztvedelem.hu/_user/downloads/biomon/biodiverzitas-magyarbeliv-low-res.pdf
- ³¹ Biodiversity Information System Europe: <https://biodiversity.europa.eu/countries/hungary>
- ³² https://op.europa.eu/en/web/who-is-who/person/-/person/CONSIL/CONSIL-MDR2_GOVREP_HUN-IND-CONSIL.HUN.17
- ³³ <https://eustafor.eu/hungary-adopts-new-national-forest-strategy-2016-2030/>
- ³⁴ http://www.nfk.gov.hu/Erdeszeti_Mero_es_Megfigyelo_Rendszer__EMMRE__news_537
- ³⁵ Hungarian Forest Management: https://portal.nebih.gov.hu/iw/web/english/hungarian-forest-management/-/asset_publisher/pHBk9pq6UNxK/content/introduction/forest-act
- ³⁶ Sustainable forest management, National Forest Strategy:
<https://cor.europa.eu/en/events/Documents/NAT/Presentation%20by%20Andr%C3%A1s%20Szepesi.pdf>
- ³⁷ Act L of 2016 on the Proclamation of the Paris Agreement Adopted by the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change
- ³⁸ https://unfccc.int/sites/default/files/cop21cmp11_hls_speech_hungary.pdf
- ³⁹ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R0841&from=EN>
- ⁴⁰ Hungarian National Reports: https://www4.unfccc.int/sites/SubmissionsStaging/NationalReports/Documents/40536871_Hungary-BR4-1-20191219_UNFCCC_BR4_fin.pdf



Background information

Land area	6.89 million hectares ¹
Forest area	0.75 million hectares, 11% ¹
Protected forests and forests under Natura 2000	6470 hectares ²
Wood fuel production	210,822 m ³ ¹
Wood fuel export	1,258 m ³ ¹

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Ireland	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(See below)	
	1. Forestry Act No. 31 of 2014 (as amended) ³ 2. Forestry Regulations S.I. No. 191 of 2017 (as amended) ⁴		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁶	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁷	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(See below)	
	1. Forestry Act No. 31 of 2014 (as amended); ³ 2. Forestry Regulations S.I. No. 191 of 2017 (as amended) ⁴		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁶	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁷	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(See below)	
	1. European Communities (Birds and Natural Habitats) Regulations S.I. No. 477 of 2011 (as amended) ⁸ 2. Planning and Development Regulations S.I. No. 600 of 2001 (as amended) ⁹ 3. Wildlife Act No. 39 of 1976 (as amended) ¹⁰		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹¹	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹¹	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹²	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(See below)	

	1. Forestry Act No. 31 of 2014 (as amended) ³ 2. Forestry Regulations S.I. No. 191 of 2017 (as amended) ⁴	
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹³
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹³
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁴
7	Maintenance of biodiversity to minimize negative impact	Yes
7.1	Law name and date?	(See below)
	1. Forestry Act No.31 of 2014 (as amended) ³ 2. Forestry Regulations S.I. No. 191 of 2017 (as amended) ⁴ 3. European Communities (Birds and Natural Habitats) Regulations S.I. No. 477 of 2011 (as amended) ⁸ 4. Wildlife Act No. 39 of 1976 (as amended) ¹⁰	
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ³
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹¹
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{15,16}
8	Maintenance and improvement of long-term production capacity	Yes
8.1	Law name and date?	Yes
	1. Forestry Act No.31 of 2014 (as amended) ³ 2. Regulation EU 2016/2031 ¹⁷ 3. Official Controls Regulation EU 2017/625 ¹⁸	
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁸
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ³
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ³

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹⁹	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁰	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁰	

¹ <http://www.fao.org/faostat/en/>, land use and forest area (2016), wood fuel production and export (2018)

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ Forestry Act 2014: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC139370>

⁴ Forestry Regulations 2017: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC167119>

⁵ <https://www.agriculture.gov.ie/media/migration/forestry/treefelling/FellingReforestationPolicyMay2017250517.pdf>

⁶ <https://www.agriculture.gov.ie/nfi/>

⁷ <https://www.agriculture.gov.ie/forests/forests-service/forests-service-general-information/about-the-forests-service/>

⁸ European Communities (Birds and Natural Habitats) Regulations S.I. No. 477 of 2011

<http://www.fao.org/faolex/results/details/en/c/LEX-FAOC107828>

⁹ Planning and Development Regulations S.I. No. 600 of 2001 <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC089176>

¹⁰ Wildlife Act No. 39 of 1976 <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC022219>

¹¹ <https://www.npws.ie/about-npws/business-units/scientific-unit>

¹² <https://www.npws.ie/legislation>

¹³ <https://www.agriculture.gov.ie/nfi/>

¹⁴ <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC167119>

¹⁵ The Forest Service: <https://www.agriculture.gov.ie/forests/forests-service/forests-service-general-information/about-the-forests-service/>

¹⁶ The National Parks and Wildlife Service (NPWS): <https://www.npws.ie/legislation>

¹⁷ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016R2031>

¹⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R0625>

¹⁹ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

²⁰ <https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx>

DRAFT



This assessment is still on-going. This is not the finalised version of the country sheet.

Background information

Land area	29.41 million hectares ¹
Forest area	9.30 million hectares, 32% ¹
Protected forests and forests under Natura 2000	4,705,630 hectares ²
Wood fuel production	10,839,000 m ³ ³
Wood fuel export	19,162 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Italy	
2	Is forestry policy/legislation of national or regional competence?	Regional competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	1. Reorganization and reform of forest and mountain land legislation, Regio Decreto-Legge 30 Dicembre 1923, n. 3267 ⁴ 2. Code of the Cultural and Landscape Heritage 22/01/2004 n° 42 ⁵ 3. National Forestry Law, Decreto legislativo of 3 Aprile 2018, n. 34 ⁶ 4. Implementation of Regulation (EC) no. 2173/2005 concerning the establishment of a FLEGT licensing system for timber imports into the European Community, Decreto legislativo 30 Ottobre 2014 ⁷		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{8,9,10,11}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{12,13}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁴	
4	Forest regeneration of harvested area	No	
4.1	Law name and date?	(see below)	
	1. Reorganization and reform of forest and mountain land legislation, Regio Decreto-Legge 30 Dicembre 1923, n. 3267 ⁴ 2. National Forestry Law, Decreto Legislativo 3 Aprile 2018, n. 34 ⁶		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	No	We are still reviewing this sub-criterion for legislation on enforcement at national or regional level -
4.3	Is there a monitoring system in place related to the law(s) above?	No	We are still reviewing this sub-criterion for legislation on enforcement at national or regional level -
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	No	We are still reviewing this sub-criterion for legislation on enforcement at national or regional level -
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	1. Framework Law on Protected Areas, Decreto legislativo of the 6 Dicembre 1991, n. 394 ¹⁵ 2. WWF and LIPU (Italian League for the Protection of Birds) 2013 Report ^{16,17}		

5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁵	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹⁵	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁸	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Reorganization and reform of forest and mountain land legislation, Regio Decreto-Legge 30 Dicembre 1923, n. 3267⁴ 2. National Forestry Law, Decreto legislativo of 3 Aprile 2018, n. 34⁶ 3. Implementing Decree of Forestry Law of 1923, Regio Decreto 16 maggio 1926, n. 1126¹⁹ 4. Environmental Code, Part III, Part IV, Part VI, Decreto legislativo 3 aprile 2006, n. 152, Codice Ambientale 152/2006²⁰ 		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{4,20}	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ²⁰	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ²⁰	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. National Forestry Law, Decreto legislativo of 3 Aprile 2018, n. 34⁶ 2. Framework Law on Protected Areas, Decreto legislativo of the 6 Dicembre 1991, n. 394¹⁵ 3. Decree implementing the EU Directive 92/43/CEE, Decreto del Presidente della Repubblica of 8 Settembre 1997, n. 357²¹ 		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{15,20,21}	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{15,21,22}	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ²²	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	Yes- covered at regional level	
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes- covered at a regional level	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes- covered at a regional level	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes- covered at a regional level	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ²³	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁴	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁴	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=ITA>

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:regio.decreto:1923-12-30;3267>

⁵ <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2004-01-22;42>

⁶ <https://www.normattiva.it/atto/caricaDettaglioAtto?atto.dataPubblicazioneGazzetta=2018-04-20&atto.codiceRedazionale=18G00060>

⁷ https://www.gazzettaufficiale.it/atto/serie_generale/caricaDettaglioAtto/originario?atto.dataPubblicazioneGazzetta=2014-12-10&atto.codiceRedazionale=14G00191&elenco30giorni=false

⁸ <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:regio.decreto:1923-12-30;3267>

⁹ <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:legge:1967;950>

¹⁰ <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2004-01-22;42>

¹¹ https://www.gazzettaufficiale.it/atto/serie_generale/caricaDettaglioAtto/originario?atto.dataPubblicazioneGazzetta=2014-12-10&atto.codiceRedazionale=14G00191&elenco30giorni=false

¹² <https://www.normattiva.it/atto/caricaDettaglioAtto?atto.dataPubblicazioneGazzetta=2018-04-20&atto.codiceRedazionale=18G00060>

¹³ <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2016-08-19;177!vig=>

¹⁴ <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2016-08-19;177!vig=>

¹⁵ <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:legge:1991-12-06;394>

¹⁶ https://d24qi7hsckwe9l.cloudfront.net/downloads/dossiernatura2000_lipu_wwf_2013.pdf

¹⁷ <https://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+WQ+E-2013-009476+0+DOC+XML+V0//EN>

¹⁸ <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2016-08-19;177!vig=>

¹⁹ <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:regio.decreto:1926;1126>

²⁰ <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2006-04-03;152>

²¹ <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.del.presidente.della.repubblica:1997-09-08;357!vig=2018-09-27>

²² <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2016-08-19;177!vig=>

²³ https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27

²⁴ <https://www4.unfccc.int/sites/ndcstaging/Pages/Party.aspx?party=ITA&prototype=1>



Background information

Land area	6.2 million hectares ¹
Forest area	3.36 million hectares, 54% ¹
Protected forests and forests under Natura 2000	549,400 hectares ²
Wood fuel production	2,200,000 m ³ ³
Wood fuel export	319,370 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Latvia	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Law on Forests from 2000 with updates till 30.01.2020, Articles 7 to 12 and 41 to 42 (Meža likums, 24.02.2000 ar papildinājumiem līdz 25.02.2020).⁴ Regulations of Cabinet of Ministers No. 935 from 2012 on Harvesting of Trees in Forest (Ministru kabineta noteikumi Nr. 935 Noteikumi par koku ciršanu mežā, 18.12.2012).⁵ Regulations of Cabinet of Ministers No. 309 from 2012 on Harvest of Trees Outside Forest (Ministru kabineta noteikumi Nr. 309 Noteikumi par koku ciršanu ārpus meža, 02.05.2012).⁶ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁷	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{8,9,10,11}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{11,12,13}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Law on Forests from 2000 with updates till 30.01.2020; Articles 17 to 25 (Meža likums, 24.02.2000 ar papildinājumiem līdz 25.02.2020).¹⁴ Regulations of Cabinet of Ministers No. 308 from 2012, on Forest Regeneration, Afforestation and Plantation Forests (Ministru kabineta noteikumi Nr. 308 Meža atjaunošanas, meža ieaudzēšanas un plantāciju meža noteikumi, 02.05.2012).¹⁵ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{11,12,15}	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{10,11,12,15}	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{10,11,12}	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Law on Forests from 2000 with updates till 30.01.2020; articles 35 to 37 (Meža likums, 24.02.2000 ar papildinājumiem līdz 25.02.2020).⁸ Protection Zone Law from 05.02.1997 with updates till 20.06.2016; articles 5 to 11 (Aizsargjoslu likums, 05.02.1997 ar papildinājumiem līdz 20.06.2016).¹⁶ Law On the Conservation of Species and Biotopes from 16.03.2000 with updates till 13.10.2017; articles 7 to 17 (Sugu un biotopu aizsardzības likums, 16.03.2000 ar papildinājumiem līdz 13.10.2017)¹⁷ 		

	4. Regulations of Cabinet of Ministers No. 936 of 2012) on Requirements for Nature Protection Measures in Forest Management (Ministru kabineta noteikumi Nr. 936 Dabas aizsardzības noteikumi meža apsaimniekošanā, 18.12.2012). ¹⁸	
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{11,16,17}
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{9,11,16,17}
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{9,18,19}
6	Maintenance of soil quality to minimize negative impact	Yes
6.1	Law name and date?	(see below)
	<ol style="list-style-type: none"> 1. Protection Zone Law from 1997 with updates till 20.06.2016, Articles 5 to 11 (Aizsargjoslu likums, 05.02.1997 ar papildinājumiem līdz 20.06.2016).¹⁶ 2. Regulations of Cabinet of Ministers No 248 from 2013, on Procedure for Evaluation of Sustainability of Forest Management, Articles 1 to 6 including Annex 1 (Ministru kabineta noteikumi Nr. 248 Meža ilgtspējīgas apsaimniekošanas novērtēšanas kārtība, 07.05.2013).¹¹ 3. Regulations of Cabinet of Ministers No 238 (03.04.2012) on National Forest Monitoring, Annex 2 (Ministru kabineta noteikumi Nr. 238 Nacionālā meža monitoringa noteikumi, 03.04.2012).¹⁰ 4. Law on Forests from 2000 with updates till 30.01.2020; Articles 6 and 35 (Meža likums, 24.02.2000 ar papildinājumiem līdz 25.02.2020).⁸ 5. Regulations of Cabinet of Ministers No 936 from 2012 on Nature Protection Measures in Forest Management, Articles 6, 8 and 10 (Ministru kabineta noteikumi Nr. 936 Dabas aizsardzības noteikumi meža apsaimniekošanā, 18.12.2012).¹⁸ 	
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹¹
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹¹
7	Maintenance of biodiversity to minimize negative impact	Yes
7.1	Law name and date?	(see below)
	<ol style="list-style-type: none"> 1. Law on Forests from 24.02.2000 with updates till 30.01.2020; articles 35 to 37 (Meža likums, 24.02.2000 ar papildinājumiem līdz 25.02.2020).⁸ 2. Protection Zone Law from 1997 with updates till 20.06.2016, Articles 5 to 11 (Aizsargjoslu likums, 05.02.1997 ar papildinājumiem līdz 20.06.2016).¹⁶ 3. Law on the Conservation of Species and Biotopes from 2000, with updates till 13.10.2017, Articles 7 to 17 (Sugu un biotopu aizsardzības likums, 16.03.2000 ar papildinājumiem 13.10.2017).¹⁷ 4. Regulations Cabinet of Ministers No. 350 from 2017 on List of Specially Protected Biotopes (Ministry kabineta noteikumi Nr. 350 Noteikumi par īpaši aizsargājamo biotopu veidu sarakstu, 20.06.2017).²⁰ 5. Regulations of Cabinet of Ministers No. 936 from 2012 on Requirements for Nature Protection Measures in Forest Management (Ministru kabineta noteikumi Nr. 936 Dabas aizsardzības noteikumi meža apsaimniekošanā, 18.12.2012).¹⁸ 	
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{11,16,17}
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{9,11,16,17}
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{9, 18,19}
8	Maintenance and improvement of long-term production capacity	Yes
8.1	Law name and date?	(see below)
	<ol style="list-style-type: none"> 1. Law on Forests from 2000 with updates till 25.02.2020, Articles 1, 2, 13, 31 and 43 (Meža likums, 24.02.2000 ar papildinājumiem līdz 25.02.2020).⁸ 2. Amelioration Law from 2010 with updates till 03.10.2019, Articles 4 and 21 (Meliorācijas likums, 14.01.2010 ar papildinājumiem līdz 01.11.2019).²¹ 	
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{5,15}
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{10,11}
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{9,10,11}

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ^{22,23}	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁴	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ^{25,26}	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=LVA>

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ [http://www.fao.org/faostat/en/wood_fuel_production_and_export_\(2018\)](http://www.fao.org/faostat/en/wood_fuel_production_and_export_(2018))

⁴ Law on Forests: <https://likumi.lv/doc.php?id=282>

⁵ Regulations No. 935: <https://likumi.lv/ta/id/253760-noteikumi-par-koku-cirsanu-meza>

⁶ Regulations No. 309: <https://likumi.lv/ta/id/247350-noteikumi-par-koku-cirsanu-arpus-meza>

⁷ <https://likumi.lv/ta/id/14594-valsts-meza-dienesta-likums>

⁸ Law on Forests: <https://likumi.lv/doc.php?id=2825>. English translation: <https://likumi.lv/ta/en/en/id/2825-law-on-forests>.

⁹ Regulations No. 384: <https://likumi.lv/ta/id/283091-meza-inventarizācijas-un-meza-valsts-registra-informācijas-aprītes-noteikumi>

¹⁰ Regulations No. 238: <https://likumi.lv/ta/id/246285-nacionāla-meza-monitoringa-noteikumi>

¹¹ Regulations No. 248: <https://likumi.lv/doc.php?id=256891>.

¹² Law on State Forest Service: <https://likumi.lv/ta/id/14594-valsts-meza-dienesta-likums>

¹³ ON EUTR and SFS: <https://www.vmd.gov.lv/valsts-meza-dienests/statiskas-lapas/es-kokmaterialu-regula?nid=1726>

¹⁴ Law on Forests in Latvian: <https://likumi.lv/doc.php?id=2825>, English translation: <https://likumi.lv/ta/en/en/id/2825-law-on-forests>.

¹⁵ Regulations No. 308: <https://likumi.lv/ta/id/247349-meza-atjaunosanas-meza-ieaudzesanas-un-plantāciju-meza-noteikumi>.

¹⁶ Protection Zone Law: <https://likumi.lv/ta/id/42348-aizsargjoslu-likums>

¹⁷ Law on the Conservation of Species and Biotopes: <https://likumi.lv/ta/id/3941-sugu-un-biotopu-aizsardzibas-likums>

¹⁸ Regulations No. 936: <https://likumi.lv/ta/id/253758-dabas-aizsardzibas-noteikumi-meza-apsaimniekosana>.

¹⁹ Regulations No. 507: <https://likumi.lv/ta/id/193117-dabas-aizsardzibas-parvaldes-nolikums>

²⁰ Regulations No. 350: <https://likumi.lv/ta/id/291790-noteikumi-par-ipasi-aizsargajamo-biotopu-veidu-sarakstu>

²¹ Amelioration law: <https://likumi.lv/ta/id/203996-meliorācijas-likums>.

²² EU NDC: https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

²³ Law on Paris Agreement: <https://likumi.lv/ta/id/288575-par-apvienoto-nāciju-organizācijas-vispārējās-konvencijas-par-klimata-parmainām-parīzes-nolīgumu>

²⁴ <https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx>

²⁵ Latvia's first NDC: <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Latvia%20First/LV-03-06-EU%20INDC.pdf>

²⁶ European Union first NDC: <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/European%20Union%20First/LV-03-06-EU%20INDC.pdf>



Background information

Land area	6.26 million hectares ¹
Forest area	2.18 million hectares, 34.8% ¹
Protected forests and forests under Natura 2000	377,000 hectares ²
Wood fuel production	1,749,000 m ³ ³
Wood fuel export	217,678 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Lithuania	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Law on Forests, Act No. I-671 of 1994 with amendments until 2020 January 1, Articles 5, 9 (Miškų įstatymas)⁴ 2. Governmental Decree on Private Forest Management and Use, Act No. 799 of 1997 with amendments until 2015 December 9, Article 30 (Privačių miškų tvarkymo ir naudojimo nuostatai)⁵ 3. Governmental Decree on Designation of Competent Authority for Implementation of EU Timber Regulation No. 995/2010, Act No. 205 of 2013 with amendments until 2016 January 1, article 1 (Dėl kompetentingų institucijų paskyrimo)⁶ 4. Order of the Minister of the Environment on Forest Management Project Preparation Rules, Act No. D1-406 of 2016 with amendments until 2019 April 5 (Miškų tvarkymo schemų ir vidinės miškotvarkos projektų rengimo taisyklės)⁷ 5. Order of the Minister of the Environment on Permits to Harvest Forest, Act No. D1-1055 of 2010 with amendments until 2016 June 7 (Leidimų kirsti mišką išdavimo tvarka)⁸ 6. Code of Administrative Offenses of the Republic of Lithuania, Act No. XII-1869 of 2015 June 25 with amendments until 2020 March 31, article 270, 271, 276 (Administracinių nusižengimų kodeksas)⁹ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁰	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{11,12}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁰	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?		
	<ol style="list-style-type: none"> 1. Law on Forests, Act No. I-671 of 1994 with amendments until 2020 January 1, Article 15 (Miškų įstatymas)⁴ 2. The Order of the Minister of the Environment on Forest Regeneration and Afforestation, Act No. D1-199 of 2008 with amendments until 2018 August 25 (Miško atkūrimo ir įveisimo nuostatai)¹³ 3. Code of Administrative Offenses of the Republic of Lithuania, Act No. XII-1869 of 2015 June 25 with amendments until 2020 March 31, Article 281 (Administracinių nusižengimų kodeksas)⁹ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁰	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{11,14}	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁰	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?		

	<ol style="list-style-type: none"> 1. Law on Protected Areas, Act No. I-301 of 1993 with amendments until 2020 January 1, Article 15 (Lietuvos Respublikos saugomų teritorijų įstatymas)¹⁵ 2. Law on Environment Protection, Act No. I-2223 of 1992 with amendments until 2020 February 8, Article 32 (Aplinkos apsaugos įstatymas)¹⁶ 3. Code of Administrative Offenses of the Republic of Lithuania, Act No. XII-1869 of 2015 June 25 with amendments until 2020 March 31, Articles 284, 285 (Administracinių nusižengimų kodeksas)⁹ 	
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{17,18}
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{19,20}
6	Maintenance of soil quality to minimize negative impact	Yes
6.1	Law name and date?	
	<ol style="list-style-type: none"> 1. Law on Forests, Act No. I-671 of 1994 with amendments until 2020 January 1, Articles 6, 9 (Miškų įstatymas)⁴ 2. The Order of the Minister of the Environment on Forest Felling Rules, Act No. D1-79 of 2010 with amendments until 2020 March 19, (Miško kirtimų taisyklės)²¹ 3. Code of Administrative Offenses of the Republic of Lithuania, Act No. XII-1869 of 2015 June 25 with amendments until 2020 March 31, Article 282 (Administracinių nusižengimų kodeksas)⁹ 	
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁰
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹¹
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁰
7	Maintenance of biodiversity to minimize negative impact	Yes
7.1	Law name and date?	
	<ol style="list-style-type: none"> 1. Law on Forests, Act No. I-671 of 1994 with amendments until 2020 January 1, Article 5 (Miškų įstatymas)⁴ 2. The Order of the Minister of the Environment on Forest Felling Rules, Act No. D1-79 of 2010 with amendments until 2020 March 19 (Miško kirtimų taisyklės)²¹ 3. Code of Administrative Offenses of the Republic of Lithuania, Act No. XII-1869 of 2015 June 25 with amendments until 2020 March 31, Articles 284, 285 (Administracinių nusižengimų kodeksas)⁹ 	
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁰
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹¹
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁰
8	Maintenance and improvement of long-term production capacity	Yes
8.1	Law name and date?	
	<ol style="list-style-type: none"> 1. Law on Forests, Act No. I-671 of 1994 with amendments until 2020 January 1, Article 14 (Miškų įstatymas)⁴ 2. Code of Administrative Offenses of the Republic of Lithuania, Act No. XII-1869 of 2015 June 25 with amendments until 2020 March 31, Article 276 (Administracinių nusižengimų kodeksas)²² 	
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ²²
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹⁴
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁰

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ²³	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁴	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁴	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=LTU>, 2016 values

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ The Law on Forests: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.6036/asr?positionInSearchResults=49&searchModelUUID=9c051af9-01d8-44ed-bd74-74accb431a97>

⁵ Governmental Decree on Private Forest Management and Use: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.41952/asr?positionInSearchResults=11&searchModelUUID=9c051af9-01d8-44ed-bd74-74accb431a97>

⁶ The Governmental Decree on Designation of Competent Authority for Implementation of EU Timber Regulation: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.444202/asr?positionInSearchResults=1&searchModelUUID=e544b4fb-5eb5-45be-8895-99bea7def7c5>

⁷ Order on Forest Management Project Preparation: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.282270/QXvdcNJzoL>

⁸ Order on Permits to Harvest Forest: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.390390>

⁹ Law on administrative offenses: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/b8d908c0215b11e58a4198cd62929b7a?jfwid=-fy7rw4k4w>

¹⁰ The State Forest Service: <http://www.amvmt.lt/>

¹¹ Annual reports on checks: <http://www.amvmt.lt/index.php/veikla/ataskaitos>

<http://www.amvmt.lt/index.php/ukio-subjektu-prieziuros-efektyvumo-vertinimas>

¹² List of planned checks: http://www.amvmt.lt/Images/Veikla/bendra/Administracine_informacija/Ukio_prieziura/2020/VMTpatikrinimuPlanas.pdf

¹³ Order on Forest Regeneration and Afforestation 4/10/2020

<https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.318353/asr?positionInSearchResults=8&searchModelUUID=10f13a74-e626-4448-8bb3-5587620c2f6c>

¹⁴ Reports on national forest inventory:

<http://www.amvmt.lt/index.php/nacionaline-misku-inventorizacija>

¹⁵ Law on Protected Areas:

<https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.5627/asr?positionInSearchResults=26&searchModelUUID=4c637d60-b8b3-4c9c-8f99-3650bc5209b9>

¹⁶ Law on Environment Protection:

<https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.2493/asr?positionInSearchResults=3&searchModelUUID=e544b4fb-5eb5-45be-8895-99bea7def7c5>

¹⁷ Reports on Natura 2000: <https://vstt.lrv.lt/lt/saugomu-teritoriju-sistema/natura-2000>

¹⁸ State Service for Protected Areas annual reports:

<https://vstt.lrv.lt/lt/vstt-administracine-informacija/veiklos-ataskaitos>

¹⁹ The State Service for Protected Areas: <https://vstt.lrv.lt/en/>

²⁰ Environmental Protection Service: <https://aad.lrv.lt/en/>

²¹ Order on Forest Felling Rules:

<https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.364764/asr?positionInSearchResults=9&searchModelUUID=add3eb90-7cb1-41b5-baf4-75dfa28575ac>

²² <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.6036/asr?positionInSearchResults=49&searchModelUUID=9c051af9-01d8-44ed-bd74-74accb431a97>

²³ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Lithuania%20First/LV-03-06-EU%20INDC.pdf>

²⁴ <https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx>



Background information

Land area	243,000 hectares ¹
Forest area	86,700 hectares, 35.7% ¹
Protected forests and forests under Natura 2000	2,000 hectares ²
Wood fuel production	84,520 m ³ ³
Wood fuel export	2,246 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Luxembourg	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	Law of July 18, 2018 concerning the protection of nature and natural resources; Instruction of November 18, 1952 concerning the management of forests subject to the forest regime, as mentioned in the Environment Code, 1997 (Loi du 18 juillet 2018 concernant la protection de la nature et des ressources naturelles; Instruction du 18 novembre 1952 concernant l'aménagement des forêts soumises au régime forestier, mentionnée dans la Code de l'Environnement, 1997) ^{4,5,6}		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{5,7}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,7,8}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{7,9}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	Instruction of November 18, 1952 concerning the management of forests subject to the forest regime, mentioned in the Environment Code, 1997 (Instruction du 18 novembre 1952 concernant l'aménagement des forêts soumises au régime forestier, mentionnée dans la Code de l'Environnement, 1997) ⁶		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁷	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁷	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁷	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	Law of July 18, 2018 concerning the protection of nature and natural resources (Loi du 18 juillet 2018 concernant la protection de la nature et des ressources naturelles) ¹⁰		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹¹	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹²	

6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	Law of July 18, 2018 concerning the protection of nature and natural resources (Loi du 18 juillet 2018 concernant la protection de la nature et des ressources naturelles) ⁵		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁷	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁷	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁷	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	Grand-ducal regulation establishing a set of aid schemes for the conservation of biological diversity, of 1 January 2002 (Règlement grand-ducal instituant un ensemble de régimes d'aides pour la sauvegarde de la diversité biologique, of 1 January 2002). Law of July 18, 2018 concerning the protection of nature and natural resources (Loi du 18 juillet 2018 concernant la protection de la nature et des ressources naturelles) ^{5,13}		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹³	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁷	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁷	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	(see below)	
	Instruction of November 18, 1952 concerning the management of forests subject to the forest regime, mentioned in the Environment Code, 1997 (Instruction du 18 novembre 1952 concernant l'aménagement des forêts soumises au régime forestier, mentionnée dans la Code de l'Environnement, 1997) ¹⁴		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁷	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁷	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁷	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹⁵	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹⁶	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ^{16,17}	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=LUX>, 2016 values

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ EUTR, as a regulation is binding in all EU Member States. <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32010R0995>

⁵ Law of 18 July 2018: <http://extwprlegs1.fao.org/docs/pdf/lux193017.pdf>

⁶ Instructions of 18 November 1952: <http://extwprlegs1.fao.org/docs/pdf/lux39766.pdf>

⁷ Administration of nature and forests: <https://anf.gouvernement.lu/fr/service.html>

⁸ SWD(2019) 126 final COMMISSION STAFF WORKING DOCUMENT. The EU Environmental Implementation Review 2019 Country Report - LUXEMBOURG. https://ec.europa.eu/environment/eir/pdf/report_lu_en.pdf

⁹ EUTR competent authority: https://ec.europa.eu/environment/forests/pdf/list_competent_authorities_eutr.pdf

¹⁰ <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC193017/>

¹¹ <https://chm.cbd.int/database/record/7C393CC4-D665-CE1D-B971-CD4271602FB8>

¹² <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC033902/>

¹³ Law of 2002: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC033902/>

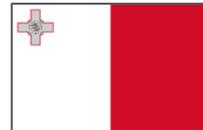
¹⁴ <http://extwprlegs1.fao.org/docs/pdf/lux39766.pdf>

¹⁵ <https://unfccc.int/process/the-paris-agreement/status-of-ratification>

¹⁶ <https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=LUX>

¹⁷ https://ec.europa.eu/clima/policies/forests/lulucf_en

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Background information

Land area	32 thousand hectares ¹
Forest area	347 hectares, 1,1% ¹
Protected forests and forests under Natura 2000	0 hectares ²
Wood fuel production	- 1
Wood fuel export	- 1

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Malta	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Subsidiary Legislation 549.94 Timber and Timber Products (Placing on the market) Regulations, Legal Notice 29 of 2015³ Subsidiary Legislation 549.95 Forest Law Enforcement, Governance and trade licensing scheme Regulations, Legal Notice 115 of 2015⁴ Subsidiary Legislation 433.10 Forest Reproductive Material Regulations, Legal Notice 273 of 2004, as amended by Legal Notices 17 of 2011 and 454 of 2013⁵ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{3,4,5}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{3,4,5}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{3,4,5}	
4	Forest regeneration of harvested area	No	
4.1	Law name and date?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
4.2	Is there an enforcement system outlined in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
4.3	Is there a monitoring system in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	No	
5.1	Law name and date?	(see below)	
	Subsidiary Legislation 549.64 Trees and Woodlands Protection Regulations, Legal notice 200 of 2011; (Part IV: Regulation of ACtivities, num. 11, 12) ⁶		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
5.3	Is there a monitoring system in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass

6	Maintenance of soil quality to minimize negative impact	No	
6.1	Law name and date?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
6.2	Is there an enforcement system outlined in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
6.3	Is there a monitoring system in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
7	Maintenance of biodiversity to minimize negative impact	No	
7.1	Law name and date?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
7.2	Is there an enforcement system outlined in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
7.3	Is there a monitoring system in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
8	Maintenance and improvement of long-term production capacity	No	
8.1	Law name and date?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
8.2	Is there an enforcement system outlined in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
8.3	Is there a monitoring system in place related to the law(s) above?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	No	No legislation specified covering this sub-criterion for harvesting of forest biomass

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ⁷	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ^{8,9}	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ⁸	

¹ <http://www.fao.org/faostat/en/>, land use and forest area (2016), wood fuel production and export (2018)

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ <https://legislation.mt/eli/si/549.94/eng/pdf>; <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC144152>

⁴ <https://legislation.mt/eli/si/549.95/eng/pdf>; <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC144157>

⁵ <https://legislation.mt/eli/si/433.10/eng/pdf>; <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC100737>

⁶ <https://legislation.mt/eli/si/549.64/eng/pdf>; <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC006920>

⁷ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

⁸ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Ireland%20First/LV-03-06-EU%20INDC.pdf>

⁹ <https://www4.unfccc.int/sites/ndcstaging/pages/Party.aspx?party=MLT>



Background information

Land area	3.37 million hectares ¹
Forest area	0.376 million hectares, 11,2% ¹
Protected forests and forests under Natura 2000	92 thousand hectares ²
Wood fuel production	2,341,000 m ³ ³
Wood fuel export	129,285 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	The Netherlands	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	1. Wet Natuurbescherming of 2020 (Law on Nature Protection), Article 2 ⁴ 2. Omgevingswet of 2016 (Environment and Planning Act), Article 4 ⁵		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁶	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{4,7}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{8,9}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	1. Wet Natuurbescherming of 2020 (Law on Nature Protection), Article 4 ¹⁰		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁶	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹¹	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹²	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	1. Wet Natuurbescherming of 2020 (Law on Nature Protection) ¹³		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁴	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹⁵	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁵	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	1. Wet Bodembescherming of 2017, Article 8 ¹⁶		

2. Besluit Bodemkwaliteit of 2019, Article 35 ^{17,18}			
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁷	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹⁹	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
1. Wet Natuurbescherming of 2020 (Law on Nature Protection) ^{20,21}			
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ²²	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ²³	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹³	
8	Maintenance and improvement of long-term production capacity	No	
8.1	Law name and date?	(see below)	
1. Wet Natuurbescherming of 2020 (Law on Nature Protection) ^{20,24}			
8.2	Is there an enforcement system outlined in place related to the law(s) above?	No ²⁴	New regulation to be published 2021 covering this
8.3	Is there a monitoring system in place related to the law(s) above?	No ²⁴	New regulation to be published 2021 covering this
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹³	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ²⁵	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁶	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁶	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=NLD>, 2016 values

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ Wet Natuurbescherming, 2020 (Law on Nature Protection), Article 2: <https://wetten.overheid.nl/BWBR0037552/2020-01-01>

⁵ Omgevingswet: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC178952/>

⁶ Wet Natuurbescherming, 2020 (Law on Nature Protection), Article 7: <https://wetten.overheid.nl/BWBR0037552/2019-01-01>

⁷ https://ec.europa.eu/environment/forests/pdf/UNEP%20WCMC%202019_Overview%20of%20CA%20checks%20January-June%202019_FINAL_17.01.2020.pdf

⁸ Nederlandse Voedsel en Warenautoriteit: <https://www.nvwa.nl/documenten/import/hout/flegt/publicaties/hout-importeren-guidance-document-eutr>

⁹ The monitoring organisation appears to be Control Union Certification: <https://certifications.controlunion.com/en>

¹⁰ Wet Natuurbescherming of 2020 (Law on Nature Protection), Article 4: <https://wetten.overheid.nl/BWBR0037552/2020-01-01>

¹¹ Wet verzelfstandiging Staatsbosbeheer (Law on the independence of Staatsbosbeheer):

<https://wetten.overheid.nl/BWBR0008904/2020-01-01/>

¹² <https://ec.europa.eu/environment/forests/pdf/UNEP%20WCMC%202019%20Overview%20of%20CA%20checks%20July-December%202018%20FINAL.pdf>

¹³ <https://wetten.overheid.nl/BWBR0037552/2020-01-01#Hoofdstuk7>

¹⁴ <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX%3A31979L0409%3ANL%3AHTML>

¹⁵ <https://wetten.overheid.nl/BWBR0037552/2019-01-01#Hoofdstuk2>

¹⁶ <https://wetten.overheid.nl/BWBR0003994/2017-01-01#Hoofdstuk1>

¹⁷ <https://wetten.overheid.nl/BWBR0022929/2019-12-18>

¹⁸ <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC082792/>

¹⁹ <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC175774/>

²⁰ Wet Natuurbescherming, 2020 (Law on Nature Protection): <https://wetten.overheid.nl/BWBR0037552/2020-01-01>

²¹ <https://www.rijksdienstcn.com/landbouw-natuur-voedselkwaliteit/natuur/natuurbeleidsplan-2018-2022>

²² <https://www.rijksoverheid.nl/onderwerpen/natuur-en-biodiversiteit/wetgeving-voor-natuurbescherming-in-nederland>

²³ Wet Natuurbescherming 2020, (Law on Nature Protection), Article 2,3,7: <https://wetten.overheid.nl/BWBR0037552/2020-01-01>

²⁴ <https://www.rijksoverheid.nl/onderwerpen/omgevingswet>

²⁵ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

²⁶ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Netherlands%20First/LV-03-06-EU%20INDC.pdf>

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Background information

Land area	30.6 million hectares ¹
Forest area	9.4 million hectares, 31%
Protected forests and forests under Natura 2000	1.6 million hectares ²
Wood fuel production	5,260,500 m ³ ¹
Wood fuel export	194,523 m ³ ¹

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Poland	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	Forest Act of 1991, Article 7-14, 66 ³ Forest Tax Act of 2002, Article 4 ⁴	
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁶	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{5,6,7}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	Forest Act of 1991, Article 13 ^{3,8}	
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{3,5}	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	Nature Conservation Act of 2004, Article 6 ⁹	
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁹	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁹	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁹	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	Forest Act of 1991, Article 9 ³	

6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁶	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	Forest Act of 1991, Article 7 ^{3, 10}	
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁶	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	Forest Act of 1991, Article 13 ³	
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ³	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ³	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹¹	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹²	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹²	

¹ <http://www.fao.org/faostat/en/>, land use and forest area (2016), wood fuel production and export (2018)

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ Forest Act: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC113774>

⁴ Forest Tax Act: <http://prawo.sejm.gov.pl/isap.nsf/download.xsp/WDU20022001682/U/D20021682Lj.pdf>

⁵ Act on the Protection of Agricultural and Forest Land, <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC129642>

⁶ The National Environmental Monitoring organisation, <http://www.gios.gov.pl/monlas>

⁷ The National Environmental Protection Inspectorate, www.gios.gov.pl

⁸ The National Forestry Directorate: http://www.lasy.gov.pl/pl/pro/publikacje/copy_of_gospodarka-lesna/hodowla/zasady-hodowli-lasu-dokument-w-opracowaniu

⁹ <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC129607>

¹⁰ The National Forestry Directorate Guidelines: http://www.lasy.gov.pl/pl/pro/publikacje/copy_of_gospodarka-lesna/hodowla/zasady-hodowli-lasu-dokument-w-opracowaniu

¹¹ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

¹² <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Poland%20First/LV-03-06-EU%20INDC.pdf>



Background information

Land area	9.16 million hectares ¹
Forest area	3.18 million hectares, 34.7% ¹
Protected forests and forests under Natura 2000	1.07 million hectares ²
Wood fuel production	1,178,200 m ³ ³
Wood fuel export	19,096 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Portugal	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	Basic Law of Forest Policy (Law 33/96) of 1996 ⁴	
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{6,7,8}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{9,10}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	Decree-Law 12/2019 of 2019 ¹¹	
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹¹	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹¹	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹¹	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?		
	1. National Strategy for the Conservation of Nature and Biodiversity 2030 of 2018 (approved by the Resolution of the Council of Ministers 55/2018) ¹²		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹²	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹²	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹³	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	Basic Law of Forest Policy (Law 33/96) of 1996 ¹⁴	

6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁰	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹⁰	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{9,10}	
7	Maintenance of biodiversity to minimize negative impact	Yes ^{15,16}	
7.1	Law name and date?		
	1. Basic Law of Forest Policy (Law 33/96) of 1996, Articles 3 and 21 ⁶ 2. Law 19/2014 of 2014 ¹⁵		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{10,17}	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹⁰	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{18,19}	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?		
	1. Basic Law of Forest Policy (Law 33/96) of 1996, articles 3 and 17 ⁶		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁰	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹⁰	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{9,10}	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ²⁰	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²¹	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²¹	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=PRT>

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ Law 33/96, Art. 5-8, 17 August 1996 <https://dre.pt/application/conteudo/406293>

⁵ https://www.gnr.pt/atrib_SPENA.aspx

⁶ Basic Law of Forest Policy (Law 33/96), 17 August 1996 <https://dre.pt/application/conteudo/406293>

⁷ Decree-Law 135/2012, 29 June 2012 <https://dre.pt/application/conteudo/178537>

⁸ Decree-Law 16/2009, 14 January 2009 <https://dre.pt/application/file/397417>

⁹ Institute for Nature Conservation and Forests <http://www2.icnf.pt/portal/florestas/ppf>

¹⁰ National Republican Guard https://www.gnr.pt/atrib_SPENA.aspx

¹¹ <https://dre.pt/application/conteudo/118051705>

¹² <https://dre.pt/application/file/a/115227157>

¹³ <https://dre.pt/application/dir/pdf1sdp/2012/06/12500/0332603330.pdf>

¹⁴ Law 33/96, Art. 3 and 4, 17 August 1996 <https://dre.pt/application/conteudo/406293>

¹⁵ National Strategy for the Conservation of Nature and Biodiversity 2030 <https://dre.pt/application/file/a/115227157>

¹⁶ Environment Basic Law: <https://dre.pt/application/conteudo/25344037>

¹⁷ NRG's mission and duties <https://www.gnr.pt/missao.aspx>

¹⁸ Law 33/96, Art. 10: <https://dre.pt/application/conteudo/406293>

¹⁹ Law 19/2014, Art. 21 <https://dre.pt/application/conteudo/25344037>

²⁰ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en; <https://unfccc.int/node/61145>

²¹ Intended NDC of the EU and its Member States: <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Portugal%20First/LV-03-06-EU%20INDC.pdf>



Background information

Land area	23.01 million hectares ¹
Forest area	6.86 million hectares, 30%
Protected forests and forests under Natura 2000	538,900 hectares ²
Wood fuel production	4,649,768 m ³ ³
Wood fuel export	61,697 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Romania	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	No	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Law 46 of 2008, Forest Code⁴ 2. Ministerial Order 766 of 2018 on Forest Management planning⁵ 3. Instructions on harvesting approved by Ministerial Order 1540 of 2011⁶ 4. Governmental Decision 470 of 2014 on timber origin and trade and the implementation of EUTR⁷ 5. Ministerial Order 837 of 2014 about the Methodology of SUMAL wood tracking system⁸ 6. Law on forest contraventions (forest administrative offences) 171 of 2010⁹ 7. Ministerial Order on forest marking hammer 1346 of 2011¹⁰ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	No ^{4, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21}	Since an infringement procedure is ongoing regarding the implementation of the EU Timber Regulation, the enforcement of the legality sub-criterion is set to no. ²² The briefing notes from UNEP-WCMC also refer to issues with enforcement of legality. ²³
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{4, 14, 24, 25, 26, 27, 28, 29, 30, 31, 32}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4, 14, 33, 34, 35}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Law 46 of 2008, Forest Code⁴ 2. Law on forest contraventions (forest administrative offences) 171 of 2010⁹ 3. Ministerial Order 1648 of 2000 on the forest regeneration technical norms³⁶ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{4, 9, 34}	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{4, 37, 38}	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4, 31}	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	No	
5.1	Law name and date?	(see below)	

	<ol style="list-style-type: none"> 1. Law 46 of 2008, Forest Code⁴ 2. Ministerial Order 766 of 2018 on Forest Management planning⁵ 3. Governmental Ordinance nr. 57 of 2007 on natural protected areas³⁹ 4. Ministerial Order 2525 of 2016 on the National Catalogue of virgin and virgin forests⁴⁰ 5. Ministerial Order 3397 of 2012 on the Criteria and indicators for virgin and virgin forest identification in Romania⁴¹ 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	No ^{4,37, 42, 43}	Both the infringement procedure as well as the UNEP-WCMC briefing notes refer to issues with the protection of protected areas ^{22, 23}
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{16,38, 44, 45, 46, 47, 48}	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{49, 50, 51, 52}	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Law 46 of 2008, Forest Code⁴ 2. Law on the funciar fond nr. 18 of 1991⁵³ 3. Ministerial Order 244 of 2002 approving the Methodology of 2002 about the monitoring of the soil-forest vegetation for silviculture⁵⁴ 		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵⁵	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁵⁶	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4,31}	
7	Maintenance of biodiversity to minimize negative impact	No	
7.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Law 46 of 2008, Forest Code⁴ 2. Ministerial Order 766 of 2018 on Forest Management planning⁵ 3. Governmental Ordinance 57 of 2007⁵⁷ 4. Ministerial Order 2525 of 2016 on the National Catalogue of virgin and virgin forests³⁸ 5. Ministerial Order 3397 of 2012 on the Criteria and indicators for virgin and virgin forest identification in Romania³⁹ 		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	No ^{4,11,12,55}	Both the infringement procedure as well as the UNEP-WCMC briefing notes refer to issues with minimizing impacts on biodiversity ^{22, 23}
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{36,38,42,43,44,45}	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{58, 59, 60, 61}	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Law 46 of 2008, Forest Code⁴ 2. Ministerial Order 1726 of 2011 for approving the Financial Guide for afforestation, ecological restoration and sustainable forest management⁶² 		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁶³	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{36,60}	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4,9,17,50}	

LULUCF Criteria

#	Criteria	National level	Comments
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9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ⁶⁴	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ⁶⁵	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ⁶⁵	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=ROU>, 2016 values

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ <http://legislatie.just.ro/Public/DetaliuDocument/170527>

⁵ <http://legislatie.just.ro/Public/DetaliuDocument/204225>

⁶ <http://legislatie.just.ro/Public/DetaliuDocument/129447>

⁷ <http://legislatie.just.ro/Public/DetaliuDocumentAfis/158885>

⁸ <http://legislatie.just.ro/Public/DetaliuDocument/162297>

⁹ <http://legislatie.just.ro/Public/DetaliuDocument/120856>;

¹⁰ <http://legislatie.just.ro/Public/DetaliuDocumentAfis/183503>

¹¹ Governmental Emergency Ordinance 85 of 2006 on forest damage evaluation: <http://legislatie.just.ro/Public/DetaliuDocument/76819>

¹² Legea nr. 265 of 2017 pentru aprobarea Ordonanței Guvernului nr. 9 of 2017 privind prorogarea termenului prevăzut la art. IV din Ordonanța de urgență a Guvernului nr. 51/2016 pentru modificarea și completarea Legii nr. 171/2010 privind stabilirea și sancționarea contravențiilor silvice: <https://lege5.ro/Gratuit/gi3dimzygq3q/legea-nr-265-2017-pentru-aprobarea-ordonantei-guvernului-nr-9-2017-privind-prorogarea-termenului-prevazut-la-art-iv-din-ordonanta-de-urgenta-a-guvernului-nr-51-2016-pentru-modificarea-si-completarea-l>

¹³ Decision of the Romanian Constitutional Court 51 of 2019 - Decizia nr. 51 din 22 ianuarie 2019 referitoare la excepția de neconstituționalitate a dispozițiilor art. 107 alin. (1) lit. a) și art. 109 alin. (1) lit. a) din Legea nr. 46/2008 - Codul silvic: <http://legislatie.just.ro/Public/DetaliuDocument/213523>

¹⁴ Law on forest contraventions (forest administrative offences) 171 of 2010: <http://legislatie.just.ro/Public/DetaliuDocument/120856>

¹⁵ Instructions on harvesting approved by Ministerial order 1540 of 2011: <http://legislatie.just.ro/Public/DetaliuDocument/129447>

¹⁶ The Annual Report on the Romanian Forests 2017: <http://aepaduri.gov.ro/wp-content/uploads/2014/07/Starea-padurilor-in-anul-2017.pdf>;

¹⁷ National Forest Inventory: <http://roifn.ro/site/rezultate-ifn-2/>

¹⁸ National Statistical Institute, 2009, Study on Energy Consumption in the Households:

https://insse.ro/cms/files/publicatii/CENG_publicatie_tabele.pdf

¹⁹ Greenpeace Romania, 2018. Illegal logging in Romania's forests 2018 report: <https://storage.googleapis.com/planet4-romania-stateless/2019/11/5cbe6848-greenpeace-illegal-logging-report-2018.pdf>

²⁰ INM, 2018: http://inm-lex.ro/fisiere/d_2441/Minuta%20intalnire%20drept%20penal%20procurori%2018%20mai%202018.pdf

²¹ Vernea, 2018: <http://www.nos.iem.ro/bitstream/handle/11748/1386/71.Vernea%20Andreea.pdf?sequence=1&isAllowed=y>

²² https://ec.europa.eu/commission/presscorner/detail/en/inf_20_202

²³ UNEP-WCMC Briefing Note for the Competent Authorities (CA) implementing the EU Timber Regulation February – May 2020:

<https://ec.europa.eu/environment/forests/pdf/EUTR%20Briefing%20note%20February-May%202020.pdf>

²⁴ Instructions on harvesting approved by Ministerial order 1540 of 2011: <http://legislatie.just.ro/Public/DetaliuDocument/129447>

²⁵ SUMAL: Governmental Decision 470 of 2014 on timber origin and trade and the implementation of EUTR, <http://legislatie.just.ro/Public/DetaliuDocumentAfis/158885> and Methodology SUMAL 2014 approved by th Ministerial Order 837 of 2014: <http://legislatie.just.ro/Public/DetaliuDocument/169398>

²⁶ Radarul pădurilor: <https://www.sts.ro/ro/radarul-padurilor>

²⁷ Daily statistics: https://www.sts.ro/files/userfiles/112/Statistica%20RADARUL%20PADURILOR/2020/MasaLemnoasa_site112_2020-04-21_082514.Pdf

²⁸ Inspectorul pădurilor: www.inspectorulpadurii.ro

²⁹ Catalog of the virgin forests: <http://aepaduri.gov.ro/paduri-virgine/>;

³⁰ National Register of the forest districts, http://mmediu.ro/new/wp-content/uploads/2014/01/2012-03-20_paduri_registruadministratordpaduriacoalesilvicenapos.pdf

³¹ Risks maps for illegal logging, posted on the Ministry website: <http://www.mmediu.ro/categorie/paduri/25>

³² Reports of Forest Guards activities in 2016: <http://www.mmediu.ro/categorie/inspectii-si-control-in-domeniul-silvic/216>

³³ Governmental Emergency Ordinance on forest guards 32 of 2015: <http://legislatie.just.ro/Public/DetaliuDocumentAfis/206826>

³⁴ National Environmental Guard Report on the implementation of the EUTR 995 of 2010:

https://www.emediu.ro/dbimg/files/Raport_activitate_GNM-2019.pdf

³⁵ Guide for EUTR 995 of 2010 implementation, 2015: http://www.mmediu.ro/app/webroot/uploads/files/Ghid_DDS.pdf

³⁶ http://bucuresti.gardaforestiera.ro/files/12494_Norm%201.pdf

³⁷ Reports of Forest Guards activities in 2016: <http://www.mmediu.ro/categorie/inspectii-si-control-in-domeniul-silvic/216>

³⁸ The Annual Report on the Romanian Forests 2017: <http://aepaduri.gov.ro/wp-content/uploads/2014/07/Starea-padurilor-in-anul-2017.pdf>

³⁹ <http://legislatie.just.ro/Public/DetaliuDocument/83289>

⁴⁰ <http://legislatie.just.ro/Public/DetaliuDocument/186018>

⁴¹ <http://legislatie.just.ro/Public/DetaliuDocumentAfis/141475>

⁴² Governmental Emergency Ordinance 85 of 2006 on forest damage evaluation: <http://legislatie.just.ro/Public/DetaliuDocument/76819>;

⁴³ Legea nr. 265 of 2017 pentru aprobarea Ordonanței Guvernului nr. 9/2017 privind prorogarea termenului prevăzut la art. IV din Ordonanța de urgență a Guvernului nr. 51/2016 pentru modificarea și completarea Legii nr. 171/2010 privind stabilirea și sancționarea contravențiilor silvice: <https://lege5.ro/Gratuit/gi3dimzygq3q/legea-nr-265-2017-pentru-aprobarea-ordonantei-guvernului-nr-9-2017-privind-prorogarea-termenului-prevazut-la-art-iv-din-ordonanta-de-urgenta-a-guvernului-nr-51-2016-pentru-modificarea-si-completarea-l>;

⁴⁴ The Inventory of the Natural Protected Areas: http://anap.gov.ro/wp-content/uploads/inventar_arii_Ro_v1-00000003.pdf

⁴⁵ The Monitoring of the conservation status by the National Agency of the Natural Protected Areas Agency: <http://anap.gov.ro/wp-content/uploads/Raportul-sintetic-privind-starea-de-conservare-a-speciilor-si-habitatelor-din-RO-1.pdf>

⁴⁶ Methodology RAPAM: <http://anap.gov.ro/monitorizare-evaluare/>

⁴⁷ Agent Green- The failure of the National catalogue of the virgin forests: <https://www.agentgreen.ro/comunicat-de-presa-catalogul-padurilor-virgine-pierdute-un-esec-national/?fbclid=IwAR33cCd9e7dBjlsVYQQHkJ2dvUjxM4aG08hJi2Rr5R7UOUVxAeiNunYW84l>

⁴⁸ Annual Report on the Environmental Protection in Romania, 2018: <http://www.anpm.ro/documents/12220/2209838/RSM+2018.pdf/e24e1dd6-450e-46bf-86e4-cff9a3482610>

⁴⁹ National Agency of Protected Areas - fonctionning on the base of Governmental Decision 997 of 2016 of 2016 about the National Agency of Protected Areas: <http://legislatie.just.ro/Public/DetaliuDocumentAfis/198367>,

⁵⁰ National Agency of Protected Areas organisation: Ministerial Order 1288 of 2018: http://ananp.gov.ro/wp-content/uploads/OM_StrOrganizANANP_1228_2018-1.pdf

⁵¹ National Environmental Guard – Garda de Mediu: https://www.emediu.ro/dbimg/files/Raport_activitate_GNM-2019.pdf

⁵² Forest Guards, Governmental Emergency Ordinance 32 of 2015: <http://legislatie.just.ro/Public/DetaliuDocumentAfis/206826>

⁵³ <http://legislatie.just.ro/Public/DetaliuDocument/1459>

⁵⁴ Ministerial Order 244 of 2002 approving the Methodology of 2002 about the monitoring of the soil-forest vegetation for silviculture: <http://legislatie.just.ro/Public/DetaliuDocumentAfis/40026>

⁵⁵ Law on forest contraventions 171 of 2010: <http://legislatie.just.ro/Public/DetaliuDocument/120856>;

⁵⁶ Geambaşu et al., 2004. Monitorizarea calitatii solurilor forestiere din Romania. Rezultate obtinute in reseaua europeana de 16x16 Km: <http://www.editurasilvica.ro/analeleicas/47/1/geambasu.pdf>

⁵⁷ <http://legislatie.just.ro/Public/DetaliuDocument/83289>

⁵⁸ Governmental Decision 997 of 2016 about the National Agency of Protected: <http://legislatie.just.ro/Public/DetaliuDocumentAfis/198367>

⁵⁹ Ministerial Order 1288 of 2018: http://ananp.gov.ro/wp-content/uploads/OM_StrOrganizANANP_1228_2018-1.pdf

⁶⁰ National Environmental Guard: https://www.emediu.ro/dbimg/files/Raport_activitate_GNM-2019.pdf

⁶¹ Governmental Emergency Ordinance 32 of 2015: <http://legislatie.just.ro/Public/DetaliuDocumentAfis/206826>);

⁶² https://www.afm.ro/main/programe/program_impadurire_terenuri_agricole_degradate/2011/ordin1726-2011.pdf

⁶³ Ministerial Order 766 of 2018 on Forest Management planning: <http://legislatie.just.ro/Public/DetaliuDocument/204225>;

⁶⁴ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

⁶⁵ <https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx>



Background information

Land area	4.81 million hectares ¹
Forest area	1.94 million hectares, 40% ¹
Protected forests and forests under Natura 2000	853,700 hectares ²
Wood fuel production	523,620 m ³ ³
Wood fuel export	58,074 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Slovakia	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Act No. 326 of 2005 on forests⁴ Decree No. 232 of 2006 of the Ministry of Agriculture of the Slovak Republic on marking timber harvesting, marking of harvested timber and documents on the origin of timber (EU Timber Regulation implementation)⁵ Act No. 113 of 2018 on placing timber and timber products to the internal market (EU Timber Regulation implementation)⁶ Act No. 543 of 2002 on the protection of nature and landscape⁷ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{6,8,8,9,10}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{11,12}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{8,10,11, 13}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Act No. 326 of 2005 on forests¹⁴ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{10,14}	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹⁵	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{8,10,11}	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Act no. 543 of 2002 on the protection of nature and landscape¹⁶ 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁷	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁸	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁸	

6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	1. Act No. 326 of 2005 on forests ⁴ 2. Act No. 543 of 2002 on the protection of nature and landscape ⁸		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁴	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁴	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁴	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	Act no. 543 of 2002 on the protection of nature and landscape ¹⁵		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{18,19}	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{10,20,21}	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{19,22}	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	(see below)	
	Act No. 326 of 2005 on forests ¹⁴		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ²³	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ²⁴	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ²⁵	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ²⁶	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁷	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁹	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=SVK>, 2016 values

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2005/326/20200101#paragraf-22>

⁵ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2006/232/20110701>

⁶ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2018/113/20200101>

⁷ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2002/543/>

⁸ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2005/326/20200101#paragraf-23>

⁹ <http://www.forestportal.sk/odborna-sekcia/statna-sprava/Stranky/default.aspx>

¹⁰ <https://www.mpsr.sk/slovenska-lesnicko-drevarska-inspekcia/sldi/47-186-1354>

¹¹ https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2005/326/20200101#predpis.diel-druhy.skupinaParagrafov-evidencia_lesnych_pozemkov

¹² <https://www.minzp.sk/iep/publikacie/komentare/ako-zlepsit-sledovanie-tazbu-dreva.html>

¹³ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2005/326/20200101>

¹⁴ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2005/326/20200101#predpis.diel-druhy>

¹⁵ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2006/453/20150215>

¹⁶ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2002/543/>

¹⁷ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2002/543/#predpis.cast-piata>

¹⁸ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2002/543/#predpis.cast-siedma>

¹⁹ https://www.minzp.sk/files/oblasti/ochrana-prirody-a-krajiny/biodiverzita/1_vlastny_ap-biod_aug_2014.pdf

²⁰ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2002/543/#paragraf-71>

²¹ https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2002/543/#predpis.cast-piata.skupinaParagrafov-straz_prirody

²² <https://www.sizp.sk/>

²³ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2005/326/20200101#predpis.diel-dvanasty>

²⁴ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2005/326/20200101#predpis.diel-siedmy.oddiel-druhy>

²⁵ <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2005/326/20200101#predpis.diel-trinasty>

²⁶ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

²⁷ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Slovakia%20First/LV-03-06-EU%20INDC.pdf>

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Background information

Land area	2.01 million hectares ¹
Forest area	1.25 million hectares, 62.2% ¹
Protected forests and forests under Natura 2000	278,000 hectares ²
Wood fuel production	1,142,133 m ³ ³
Wood fuel export	384,821 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Slovenia	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes ^{4,5}	
3.1	Law name and date?	Act on Forests of 1993, Chapter III, Section 1, article 17 (Zakon o gozdovih) ⁶	
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{6,7}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁶	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁶	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	Act on Forests of 1993, Articles 17 and 23 (Zakon o gozdovih) ⁶	
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁶	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁶	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁶	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes ⁶	
5.1	Law name and date?	Nature Conservation Act of 1999, Article 1 (Zakon o ohranjanju narave) ⁸	
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁸	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁸	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁸	
6	Maintenance of soil quality to minimize negative impact	Yes	

6.1	Law name and date?	Act on Forests of 1993, Chapter III, Section 1, article 17(3) (Zakon o gozdovih) ^{5,6}	
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁶	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,6}	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁶	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	Act on Forests of 1993, Chapter III, Section 2 (Zakon o gozdovih) ^{6,9}	
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁶	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁶	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{6,8}	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	Act on Forests of 1993, Chapter I, Article 1 (Zakon o gozdovih) ^{6,10}	
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁶	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁶	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁶	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹¹	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹²	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹²	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=SVN>, 2016 values

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ <http://www.fao.org/faostat/en/> wood fuel production and export (2018)

⁴ Cadastral Income Act: <http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO7125>

⁵ Rules on felling, managing wood residues, harvesting and stacking of timber assortments:

<http://www.pisrs.si/Pis.web/pregledPredpisa?id=PRAV2997>

⁶ Forest Act: <http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO270&pogled=osnovni>

⁷ Newspaper article on enforcement case:

<https://www.slovenskenovice.si/novice/slovenija/clanek/sekal-zaradi-lubadarja-in-placal-kazen-271759>

⁸ Nature Conservation Act: <http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO1600>

⁹ Rules on forest protection: <http://www.pisrs.si/Pis.web/pregledPredpisa?id=PRAV9492>

¹⁰ Resolution on National Forest Programme: <http://www.pisrs.si/Pis.web/pregledPredpisa?id=RESO56>

¹¹ Act ratifying the Paris Agreement (Zakon o ratifikaciji Pariškega sporazuma) of 2016:

<http://pisrs.si/Pis.web/pregledPredpisa?id=ZAKO7545>

¹² <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Slovenia%20First/LV-03-06-EU%20INDC.pdf>



Background information

Land area	49.96 million hectares ¹
Forest area	18.42 million hectares, 36.9%
Protected forests and forests under Natura 2000	5.48 million hectares ²
Wood fuel production	2,268,594 m ³ ³
Wood fuel export	24,443 m ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Spain	
2	Is forestry policy/legislation of national or regional competence?	Regional competence ⁴	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Ley 21/2015, de 20 de julio, por la que se modifica la Ley 43/2003, de 21 de noviembre, de Montes (BOE 21/07/2015) (Spanish Forest Law)⁵ Real Decreto 1088/2015, de 4 de diciembre, para asegurar la legalidad de la comercialización de madera y productos de la madera (Royal Decree to guarantee the legality of the timber trade)⁶ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,6,7,8}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Ley 21/2015, de 20 de julio, por la que se modifica la Ley 43/2003, de 21 de noviembre, de Montes (BOE 21/07/2015) (Spanish Forest Law)⁵ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,9}	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Ley 42/2007, de 13 de diciembre, del Patrimonio Natural y de la Biodiversidad. (Law on the Natural Heritage and Biodiversity)¹⁰ Real Decreto 1015/2013, de 20 de diciembre, por el que se modifican los anexos I, II y V de la Ley 42/2007, de 13 de diciembre, del Patrimonio Natural y de la Biodiversidad (Royal Decree modifying the annexes of the Law 42/2007) Ley 21/2015, de 20 de julio, por la que se modifica la Ley 43/2003, de 21 de noviembre, de Montes (BOE 21/07/2015) (Spanish Forest Law)⁵ 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁰	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹⁰	

5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁰	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	1. Ley 21/2015, de 20 de julio, por la que se modifica la Ley 43/2003, de 21 de noviembre, de Montes (BOE 21/07/2015) (Spanish Forest Law) ⁵		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁵	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	
7	Maintenance of biodiversity to minimize negative impact	Yes ⁵	
7.1	Law name and date?	(see below)	
	1. Ley 21/2015, de 20 de julio, por la que se modifica la Ley 43/2003, de 21 de noviembre, de Montes (BOE 21/07/2015) (Spanish Forest Law) ⁵		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁵	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	
8	Maintenance and improvement of long-term production capacity	Yes ⁵	
8.1	Law name and date?	(see below)	
	1. Ley 21/2015, de 20 de julio, por la que se modifica la Ley 43/2003, de 21 de noviembre, de Montes (BOE 21/07/2015) (Spanish Forest Law) ⁵		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁵	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹¹	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ^{12,13,14}	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹²	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=ESP>, 2016 values

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ A legislative framework exists in Spain at a national level (Código Forestal 2: Normas sobre Ordenación y Aprovechamientos Forestales). However, its implementation is carried-out by regions hence why the forestry policy/legislation has been indicated as of regional competence.

⁵ Spanish Forest Law: <https://www.boe.es/buscar/act.php?id=BOE-A-2003-21339>

⁶ https://www.boe.es/diario_boe/txt.php?id=BOE-A-2015-13437

⁷ Plan Nacional de Control de la Legalidad de la Madera Comercializada (2018) (National Plan for the control of the legality of the timber trade 2018): https://www.mapa.gob.es/es/desarrollo-rural/temas/politica-forestal/plannacionaldecontroldelegalidaddelamaderacomercializada_tcm30-484989.pdf

⁸ Biannual reports required by the EU: https://www.mapa.gob.es/es/desarrollo-rural/temas/politica-forestal/Madera_Legal_FLEGT_EUTR/EUTR/EUTR_Infomes.aspx

⁹ https://www.mapa.gob.es/es/desarrollo-rural/temas/politica-forestal/control_cortas_de_madera_espanya_2012_tcm30-152390.pdf

¹⁰ <https://www.boe.es/buscar/act.php?id=BOE-A-2007-21490>

¹¹ Declarations: https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtmsg_no=XXVII-7-d&chapter=27&clang=_en#EndDec

¹² Intended Nationally Determined Contribution of the EU and its Member States (12/01/2017):
<https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Spain%20First/LV-03-06-EU%20INDC.pdf>

¹³ Spanish NAMA:

https://www4.unfccc.int/sites/PublicNAMA/_layouts/un/fccc/nama/InformationOnSupportAvailable.aspx?ID=69&viewOnly=1

¹⁴ Draft of new Law on Climate Change and Energy Transition: <https://www.miteco.gob.es/es/prensa/ultimas-noticias/la-ley-de-cambio-climatico-y-transicion-energetica-entra-en-la-recta-final-de-su-tramitacion-administrativa/tcm:30-506983>

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Background information

Land area	40.73 million hectares ¹
Forest area	28.07 million hectares, 69%
Protected forests and forests under Natura 2000	2,245,030 hectares ²
Wood fuel production	7,000,000 m ³ ³
Wood fuel export	28,810 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Sweden	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Forestry Act of 1979⁴ Environmental Code of 1998⁵ Forestry Ordinance of 1993⁶ Swedish administrative provisions and common advice⁷ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{4,8}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{4,8,9}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4,10}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Forestry Act of 1979⁴ Forestry Ordinance of 1993⁶ Swedish administrative provisions and common advice⁷ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{4,8}	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹¹	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹²	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Forestry Act of 1979⁴ Swedish administrative provisions and common advice⁷ Environmental Code of 1998¹³ 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{14,15}	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{8,16,17}	

5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁸	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forestry Act of 1979⁴ 2. Environmental Code of 1998¹³ 3. Species protection ordinance of 2007¹⁹ 4. Guidance on environmental considerations in bioenergy from forests²⁰ 5. Målbilder för god miljöhänsyn²¹ 		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ²²	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{23,24}	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ²⁵	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forestry Act of 1979⁴ 2. Environmental Code of 1998¹³ 3. Species protection ordinance of 2007²⁶ 4. Guidance on environmental considerations in bioenergy from forests²⁰ 5. Law, 2010:598²⁷ 		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{28,29,30,31,32}	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ³³	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ³⁴	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forestry Act of 1979⁴ 		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ³⁵	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ³⁶	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ³⁷	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ³⁸	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ³⁹	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ³⁹	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=SWE>

² https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)

⁴ https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/skogsvardslag-1979429_sfs-1979-429

⁵ https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/miljobalk-1998808_sfs-1998-808

⁶ https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/skogsvardsforordning-19931096_sfs-1993-1096

- ⁷ <https://www.skogsstyrelsen.se/lag-och-tillsyn/forfattningar/>
- ⁸ Forest Agency report 2019/15: <https://www.skogsstyrelsen.se/globalassets/om-oss/publikationer/2019/rapport-2019-15-underlag-for-genomforande-av-direktivet-om-framjande-av-anvandningen-av-energi-fran-fornybara-energikallor.pdf>
- ⁹ Monitoring data: <https://www.skogsstyrelsen.se/statistik/statistik-efter-amne/avverkningsanmalningar/>
- ¹⁰ Act on trade in timber and wood products: https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/lag-20141009-om-handel-med-timmer-och-travaror_sfs-2014-1009
- ¹¹ <https://www.skogsstyrelsen.se/statistik/statistik-efter-amne/atervaxternas-kvalitet/>
- ¹² https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/skogsvardslag-1979429_sfs-1979-429
- ¹³ https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/miljobalk-1998808_sfs-1998-808
- ¹⁴ Rules regarding forestry and Natura 2000: <https://www.skogsstyrelsen.se/aga-skog/skydda-skog/natura-2000/>
- ¹⁵ 2019 assessment of the Sustainable Forests EQO: <https://www.skogsstyrelsen.se/globalassets/om-oss/publikationer/2019/rapport-2019-02-fordjupad-utvardering-av-levande-skogar-2019.pdf>
- ¹⁶ Budget Proposition 2016: https://www.riksdagen.se/sv/dokument-lagar/dokument/proposition/budgetproposition-2016-utgiftsomrade-20-allman_H3031d22/html
- ¹⁷ Protected forests: <https://www.naturvardsverket.se/upload/miljoarbete-i-samhallet/miljoarbete-i-sverige/naturvard/skydd-av-skog/formellt-skyddad-skogsmark-2019-06-27.pdf>
- ¹⁸ https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/skogsvardslag-1979429_sfs-1979-429
- ¹⁹ https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/artskyddsforordning-2007845_sfs-2007-845
- ²⁰ <https://www.skogsstyrelsen.se/globalassets/om-oss/publikationer/2019/rapport-2019-14-regler-och-rekommendationer-for-skogsbransleuttag-och-kompensationsatgarder.pdf>
- ²¹ <https://www.skogsstyrelsen.se/mer-om-skog/malbilder-for-god-miljohansyn/>
- ²² <https://www.skogsstyrelsen.se/globalassets/om-oss/publikationer/2019/rapport-2019-02-fordjupad-utvardering-av-levande-skogar-2019.pdf>
- ²³ Monitoring data: <https://www.skogsstyrelsen.se/statistik/statistik-efter-amne/miljohansyn-vid-foryngringsavverkning/>
- ²⁴ Field instructions for monitoring: <https://www.skogsstyrelsen.se/statistik/statistik-efter-amne/miljohansyn-vid-foryngringsavverkning/>
- ²⁵ https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/skogsvardslag-1979429_sfs-1979-429
- ²⁶ https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/artskyddsforordning-2007845_sfs-2007-845
- ²⁷ https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/lag-2010598-om-hallbarhetskriterier-for_sfs-2010-598
- ²⁸ 2019 assessment of the Sustainable Forests EQO: <https://www.skogsstyrelsen.se/globalassets/om-oss/publikationer/2019/rapport-2019-02-fordjupad-utvardering-av-levande-skogar-2019.pdf>
- ²⁹ Artdatabanken national red list: <https://www.arterdatabanken.se/publikationer/bestall-publikationer/tillstand-och-trender-for-arter-och-deras-livsmiljoer-rodlistade-arter-i-sverige-2015/>
- ³⁰ EPA 2019: <https://www.naturvardsverket.se/Documents/publikationer6400/978-91-620-6890-5.pdf?pid=24788>
- ³¹ Eide 2014: <https://www.arterdatabanken.se/publikationer/bestall-publikationer/arter--naturtyper-i-habitatdirektivet--bevarandestatus-i-sverige-2013/>
- ³² EU Environmental Implementation Review Country Report – Sweden: https://ec.europa.eu/environment/eir/pdf/report_se_en.pdf
- ³³ Monitoring data: <https://www.skogsstyrelsen.se/statistik/statistik-efter-amne/miljohansyn-vid-foryngringsavverkning/>
- ³⁴ https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/skogsvardslag-1979429_sfs-1979-429
- ³⁵ <https://www.skogsstyrelsen.se/statistik/statistik-efter-amne/atervaxternas-kvalitet/>
- ³⁶ <https://www.slu.se/centrumbildningar-och-projekt/riksskogstaxeringen/>
- ³⁷ https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/skogsvardslag-1979429_sfs-1979-429
- ³⁸ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en
- ³⁹ <https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=SWE>



Background information

Land area	20,298 million hectares ¹
Forest area	8633 million hectares, 31% ¹
Protected forests and forests under Natura 2000	unknown
Wood fuel production	12,356,300 m ³ ²
Wood fuel export	139,653 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Belarus	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	No	
3.1	Law name and date?	Reference 1-24 (See appendix for an overview of references) ³	
3.2	Is there an enforcement system outlined in place related to the law(s) above?	No (reference 25-27)	The laws refer to standards and they refer to Technical Codes (TCPs). Several TCPs have been revoked and not replaced. Without these Technical Codes of Standard Practice, the legal system does not define important practical aspects of Sustainable Forest Management and it is unclear how this can then be enforced
3.3	Is there a monitoring system in place related to the law(s) above?	Yes (reference 28-30)	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes (reference 31-36)	
4	Forest regeneration of harvested area	No	
4.1	Law name and date?	Reference 37-43 (See appendix for an overview of references)	
4.2	Is there an enforcement system outlined in place related to the law(s) above?	No (reference 44-45)	The laws refer to standards and they refer to Technical Codes (TCPs). Several TCPs have been revoked and not. Without these Technical Codes of Standard Practice, the legal system does not define important practical aspects of Sustainable Forest Management and it is unclear how this can then be enforced
4.3	Is there a monitoring system in place related to the law(s) above?	Yes (reference 46-50)	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes (reference 51-44)	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	Reference 56-70 (See appendix for an overview of references)	

	national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected		
5.1	Law name and date?	Reference 56-70 (See appendix for an overview of references)	
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes (reference 71-75)	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes (reference 76-78)	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	Reference 79-89 (See appendix for an overview of references)	
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes (reference 90-95)	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes (reference 96-98)	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes (reference 99-103)	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	Reference 104-1116 (See appendix for an overview of references)	
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes (reference 117-121)	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes (reference 122-128)	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes (reference 129-132)	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	Reference 133-142 (See appendix for an overview of references)	
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes (reference 143-145)	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes (reference 146-147)	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes (reference 158-152)	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes (reference 153)	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes (reference 154)	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	No (reference 155-157)	
10.b.i	The country has national laws in place, applicable to the harvest area, to conserve and enhance carbon stock and sinks over the long term?	Yes (reference 158-169)	

10.b.ii	The country can provide evidence that reported LULUCF sector emissions to not exceed removal?	Yes (reference 170-174)	
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Belarus – overview of references

Q	R e f #	Description	Description in native language	Reference
3.1	1	Forest code of the Republic of Belarus No. 332-Z of 2015	Кодекс Республики Беларусь от 24.12.2015 N 332-3 Лесной кодекс Республики Беларусь	http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
3.1	2	Decree of the President of the Republic of Belarus of May 7, 2007 No. 214 "On some measures to improve activities in the field of forestry" // NRPA RB. 2007. No 1/8576	Указ Президента Республики Беларусь от 7 мая 2007 года № 214 «О не некоторых мерах по совершенствованию деятельности в сфере лесного хозяйства» // НРПА РБ. 2007. № 1/8576	http://www.fao.org/faolex/results/details/en/c/LEX-FAOC081415/
3.1	3	The Ministry of Forestry is entrusted with the functions of carrying out state policy in the field of use, protection, protection of the forest fund and reproduction of forests, state control over all legal entities conducting forestry, on the use of the forest fund, its protection and protection, reproduction of forests, their consideration, as well as other rules and regulations provided for by forest and environmental the legislation of the Republic of Belarus.		
3.1	4	Land code No. 425-Z of 2009	Кодекс Республики Беларусь о земле (вступает в силу с 1 января 2009 года)	LEX-FAOC092921: Land Code (Law No. 425-Z), http://www.fao.org/faolex/results/details/en/c/LEX-FAOC092921
3.1	5	The Code of Administrative Offences No. 194-Z of 21.04.2003.	Кодекс Республики Беларусь об административных правонарушениях от 21 апреля 2003 г. № 194-3	https://etalonline.by/document/?regnum=Hk03000194
3.1	6	Procedural-Executive Code of Administrative Offences No. 194-Z of 20.12.2006.	Процессуально-исполнительный кодекс Республики Беларусь об административных правонарушениях № 194-3 20 декабря 2006 г.	http://pravo.by/document/?guid=3871&p0=Hk0600194
3.1	7	LAW OF THE REPUBLIC OF BELARUS July 12, 2013 № 53-3 "About investments"	ЗАКОН РЕСПУБЛИКИ БЕЛАРУСЬ, 12 июля 2013 г. № 53-3 "Об инвестициях"	http://pravo.by/document/?guid=3871&p0=H11300053
3.1	8	Law No. 63-Z "On concessions"	Закон Республики Беларусь от 12.07.2013 № 63-3 "О концессиях"	LEX-FAOC136871: Law No. 63-Z "On concessions, http://www.fao.org/faolex/results/details/en/c/LEX-FAOC136871
3.1	9	Law No. 131-Z on penalties for the infringement of forest and veterinary legislation.	ЗАКОН РЕСПУБЛИКИ БЕЛАРУСЬ 17 июля 2018 г. № 131-3 О внесении изменений и дополнений в некоторые кодексы Республики Беларусь.	LEX-FAOC178312: Law No. 131-Z on penalties for the infringement of forest and veterinary legislation. http://www.fao.org/faolex/results/details/en/c/LEX-FAOC178312
3.1	10	Decree No. 19 of the Ministry of Forestry validating the Regulation on tenders for selection of contractors for public forestry programs of 2016.	ПОСТАНОВЛЕНИЕ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ 27 сентября 2016 г. № 19 Об утверждении Инструкции о порядке проведения конкурсов по выбору исполнителей мероприятий государственных программ.	http://www.fao.org/faolex/results/details/en/c/LEX-FAOC163447
3.1	11	Decree No. 71 of the Ministry of Forestry validating the Regulation for harvesting of stumps, roots, wood juices, planting of fruits, berry and nut forest plantations, growing medicinal plants and other plant species, and procurement thereof of 2016.	ПОСТАНОВЛЕНИЕ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ 19 декабря 2016 г. № 71 Об утверждении Правил заготовки пней и корней, заготовки древесных соков, создания плодово-ягодных, орехоплодных и иных лесных плантаций, по выращиванию на них лекарственных и иных растений, их заготовке, сбору и признании утратившими силу некоторых постановлений Министерства лесного хозяйства Республики Беларусь.	http://www.fao.org/faolex/results/details/en/c/LEX-FAOC163285
3.1	12	Ministerial Decree No. 298 regarding the sphere of competence of the Forest Ministry. Date of original text: 16 March 2004 (29 July 2006)	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 16 марта 2004 г. № 298 ВОПРОСЫ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ	http://pravo.by/document/?guid=3871&p0=C20400298
3.1	13	Decree No. 79 of the Ministry of Forestry validating Sanitary Forest Regulation of 19 December 2016.	ПОСТАНОВЛЕНИЕ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ	LEX-FAOC163284: Decree No. 79 of the Ministry of

			БЕЛАРУСЬ 19 декабря 2016 г. № 79, Об утверждении Санитарных правил в лесах Республики Беларусь	Forestry validating Sanitary Forest Regulation of 19 December 2016 http://www.fao.org/faolex/results/details/en/c/LEX-FAOC163284
3.1	1 4	MINISTERIAL DECREE REPUBLICS OF BELARUS March 5, 2019 № 6 On amendment of the decree of the Ministry of Forestry farms of the Republic of Belarus of December 19, 2016 № 79	ПОСТАНОВЛЕНИЕ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ 5 марта 2019 г. № 6 Об изменении постановления Министерства лесного хозяйства Республики Беларусь от 19 декабря 2016 г. № 79	http://pravo.by/upload/docs/opp/W21933996_1553720400.pdf
3.1	1 5	Decree of the President of the Republic of Belarus No 325 of June 22, 2010 on departmental control in the Republic of Belarus" (as amended on 03-06-2016)	Указ Президента Республики Беларусь от 22 июня 2010 г. № 325 О ведомственном контроле в Республике Беларусь	http://www.pravo.by/document/?guid=3961&p0=P31000325
3.1	1 6	Ministerial Decree No. 383 on allotment of standing timber.	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 29 марта 2002 г. № 383 О НЕКОТОРЫХ МЕРАХ ПО СОВЕРШЕНСТВОВАНИЮ ПОЛЬЗОВАНИЯ ЛЕСНЫМИ РЕСУРСАМИ В РЕСПУБЛИКЕ БЕЛАРУСЬ	http://www.fao.org/faolex/results/details/en/c/LEX-FAOC065525
3.1	1 7	Decree № 954 of December 31, 2019. On establishing the tax value for the timber of the main forest species to be sold at the root in 2020	Постановление Совета Министров Республики Беларусь от 31 декабря 2019 г. № 954 Об установлении таксовой стоимости на древесину основных лесных пород, отпускаемую на корню, в 2020 году	http://www.government.by/upload/docs/file2cdd84ee8b215998.PDF
3.1	1 8	Decree No. 109 of the Council of Ministers amending forestry-related legislative acts. 08.02.2018	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 8 февраля 2018 г. № 109	LEX-FAOC175282: Decree No. 109 of the Council of Ministers amending forestry-related legislative acts. : http://www.fao.org/faolex/results/details/en/c/LEX-FAOC175282
3.1	1 9	TCP 622-2018 (33090) Technical requirements for forestry . Determining and taxating plots in the forests of the Republic of Belarus 01.10.2018	ТКП 622-2018 (33090) Технические требования при лесоустройстве. Отвод и таксация лесосек в лесах Республики Беларусь 01.10.2018	http://www.tnpa.by/#!/DocumentCard/399460/529265
3.1	2 0	TCP 634-2019 (33090) Procedure for carrying out forest protection measures in forests 01.06.2019	ТКП 634-2019 (33090) Порядок проведения лесозащитных мероприятий в лесах 01.06.2019	http://www.tnpa.by/#!/DocumentCard/357568/483595
3.1	2 1	TCP 500-2016 (33090) Forestry roads. Design rules and device rules	ТКП 500-2016 (33090) Лесохозяйственные дороги. Нормы проектирования и правила устройства. 01.10.2016	http://www.tnpa.by/#!/DocumentCard/357568/483595
3.1	2 2	TCP 575-2015 (33090) Sustainable forest management and forest operations. Guidance on growing planting material of wood and shrub species in forest nurseries of the Republic of Belarus	ТКП 575-2015 (33090) Устойчивое лесопользование и лесопользование. Наставление по выращиванию посадочного материала древесных и кустарниковых видов в лесных питомниках Республики Беларусь	http://www.tnpa.by/#!/DocumentCard/341480/465329
3.1	2 3	TCP 587-2016 (33090) Sustainable forest management and forest management. Rules for allocating forest types. 01.01.2017	ТКП 587-2016 (33090) Устойчивое лесопользование и лесопользование. Правила выделения типов леса. 01.01.2017	http://www.tnpa.by/#!/DocumentCard/362096/489152
3.1	2 4	Decree of the Council of Ministers of the Republic of Belarus dated July 14, 2003 No. 949 "On the National Environmental Monitoring System in the Republic of Belarus"	Постановление Совета Министров Республики Беларусь от 14 июля 2003 г. №949 "О Национальной системе мониторинга окружающей среды в Республике Беларусь"	http://pravo.levonevsky.org/bazaby09/sbor40/text40725.htm : http://www.minpriroda.gov.by/en/envmonitoring-en/
3.2	2 5	Forest code of the Republic of Belarus No. 332-Z of 2015	Лесной кодекс Республики Беларусь от 24.12.2015 N 332-3	LEX-FAOC159387: Forest Code (Law No. 332-Z), http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
3.2	2 6	Ministerial Decree No. 298 regarding the sphere of competence of the Forest Ministry. 16 March 2004 (revision of 29 July 2006)	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 16 марта 2004 г. № 298 ВОПРОСЫ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ	http://pravo.by/document/?guid=3871&p0=C20400298
3.2	2 7	Decree No 376 of 16 October 2017 "On measures to improve auditing (oversight) activities"		http://president.gov.by/en/news_en/view/commentary-to-decree-no-376-of-16-october-2017-17321/
3.3	2 8	Ministerial Decree No. 298 regarding the sphere of competence of the Ministry of Forestry. 16 March 2004 (revision of 29 July 2006)	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 16 марта 2004 г. № 298 ВОПРОСЫ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ	http://pravo.by/document/?guid=3871&p0=C20400298
3.3	2 9	LEX-FAOC175282: Decree No. 109 of the Council of Ministers amending forestry-related legislative acts.	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 8 февраля 2018 г. № 109	http://www.fao.org/faolex/results/details/en/c/LEX-FAOC175282

3.3	3 0	Decree of the Council of Ministers of the Republic of Belarus dated July 14, 2003 No. 949 "On the National Environmental Monitoring System in the Republic of Belarus"	Постановление Совета Министров Республики Беларусь от 14 июля 2003 г. №949 "О Национальной системе мониторинга окружающей среды в Республике Беларусь"	http://pravo.levonevsky.org/ba/zaby09/sbor40/text40725.htm ; http://www.minpriroda.gov.by/en/envmonitoring-en/
3.4	3 1	The Code of Administrative Offences No. 194-Z of 21.04.2003.	Кодекс Республики Беларусь об административных правонарушениях от 21 апреля 2003 г. № 194-З	http://pravo.by/document/?guid=3961&p0=Hk0300194
3.4	3 2	Ministerial Decree No. 298 regarding the sphere of competence of the Forest Ministry. Date of original text: 16 March 2004 (29 July 2006)	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 16 марта 2004 г. № 298 ВОПРОСЫ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ	http://pravo.by/document/?guid=3871&p0=C20400298
3.4	3 3	State Inspectorate for Protection of Fauna and Flora under the President of the Republic of Belarus.		http://gosinspekciya.gov.by/infomation/
3.4	3 4	The State Control Committee of the Republic of Belarus (2019). The Committee investigated the legality of activities of forestry enterprises, December 2019 and brought many people to justice		http://kgk.gov.by/by/newspress-center-by/view/bole-100-dolznostryx-lits-lesxozov-i-gomelskogo-gplxo-privlecheny-k-distsiplinarnoj-otvetstvennosti-za-110330/
3.4	3 5	The Code of Administrative Offences No. 194-Z of 21.04.2003.	Кодекс Республики Беларусь об административных правонарушениях от 21 апреля 2003 г. № 194-З	http://pravo.by/document/?guid=3961&p0=Hk0300194
3.4	3 6	Procedural-Executive Code of Administrative Offences No. 194-Z of 20.12.2006.	Процессуально-исполнительный кодекс Республики Беларусь об административных правонарушениях № 194-З 20 декабря 2006 г.	http://pravo.by/document/?guid=3871&p0=Hk0600194
4.1	3 7	LEX-FAOC159387: Forest code of the Republic of Belarus (Law No. 332-Z)	Кодекс Республики Беларусь от 24.12.2015 N 332-З Лесной кодекс Республики Беларусь	http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
4.1	3 8	CODE OF REPUBLIC OF BELARUS ON ADMINISTRATIVE VIOLATIONS № 194-3, April 21, 2003	КОДЕКС РЕСПУБЛИКИ БЕЛАРУСЬ ОБ АДМИНИСТРАТИВНЫХ ПРАВОНАРУШЕНИЯХ, № 194-3, 21 апреля 2003 г.	https://etalonline.by/document/?regnum=Hk0300194
4.1	3 9	Procedural-Executive Code of Administrative Offences No. 194-Z of 20.12.2006.	Процессуально-исполнительный кодекс Республики Беларусь об административных правонарушениях № 194-З 20 декабря 2006 г.	http://pravo.by/document/?guid=3871&p0=Hk0600194
4.1	4 0	MINISTERIAL DECREE REPUBLICS OF BELARUS December 19, 2016 № 73 On some issues of forest reproduction in the field of seed production of forest plants.	ПОСТАНОВЛЕНИЕ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ, 19 декабря 2016 г. № 73, О некоторых вопросах воспроизводства лесов в области семеноводства лесных растений.	http://pravo.by/upload/docs/op/W21631597_1484600400.pdf
4.1	4 1	LEX-FAOC178312: Law No. 131-Z on penalties for the infringement of forest and veterinary legislation		http://www.fao.org/faolex/results/details/en/c/LEX-FAOC178312
4.1	4 2	Decree of the President of the Republic of Belarus No 325 of June 22, 2010 on departmental control in the Republic of Belarus" (as amended on 03-06-2016)	Указ Президента Республики Беларусь от 22 июня 2010 г. № 325 О ведомственном контроле в Республике Беларусь	http://www.pravo.by/document/?guid=3961&p0=P31000325
4.1	4 3	17.06-10-2013 (02120) on environmental protection and nature use. Hydrosphere. Rules for the provision of migration in the family of forests and the creation of optimal conditions for their reproduction in the Republic of Belarus.	ТКП 17.06-10-2013 (02120) Охрана окружающей среды и природопользование. Гидросфера. Правила обеспечения миграции рыб семейства лососевых и создания оптимальных условий для их воспроизводства на реках Республики Беларусь;	http://www.tnpa.by/#!/DocumentCard/305610/424104
4.2	4 4	Forest code of the republic of Belarus No. 332-Z of 2015	Лесной кодекс Республики Беларусь от 24.12.2015 N 332-З	http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
4.2	4 5	Ministerial Decree No. 298 regarding the sphere of competence of the Forest Ministry. 16 March 2004 (revision of 29 July 2006)	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 16 марта 2004 г. № 298 ВОПРОСЫ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ	http://pravo.by/document/?guid=3871&p0=C20400298
4.3	4 6	Forest code of the Republic of Belarus No. 332-Z of 2015	Кодекс Республики Беларусь от 24.12.2015 N 332-З Лесной кодекс Республики Беларусь	LEX-FAOC159387: Forest code of the Republic of Belarus (Law No. 332-Z), http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
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4.4	5 2	Ministerial Decree No. 298 regarding the sphere of competence of the Ministry of Forestry. 16 March 2004 (revision of 29 July 2006)	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 16 марта 2004 г. № 298 ВОПРОСЫ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ	http://pravo.by/document/?guid=3871&p0=C20400298
4.4	5 3	State Inspectorate for Protection of Fauna and Flora		http://gosinspekciya.gov.by/information/
4.4	5 4	The official website of the State Control Committee of the Republic of Belarus:		kgk.gov.by
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5.1	5 6	LEX-FAOC159387: Forest code of the Republic of Belarus (Law No. 332-Z)		http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
5.1	5 7	Procedural-Executive Code of Administrative Offences No. 194-Z of 20.12.2006.	Процессуально-исполнительный кодекс Республики Беларусь об административных правонарушениях № 194-З 20 декабря 2006 г.	http://pravo.by/document/?guid=3871&p0=Hk0600194
5.1	5 8	LEX-FAOC092921: Land Code (Law No. 425-Z)		http://www.fao.org/faolex/results/details/en/c/LEX-FAOC092921
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5.1	6 0	LEX-FAOC037863. Law No. 1982-XII of 1992 on protection of the environment		http://www.fao.org/faolex/results/details/en/c/LEX-FAOC037863/
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5.1	6 4	Law "On Nature Conservation" dated November 26, 1992 (National Register of Legal Acts of the Republic of Belarus, 2002, № 85, 2/875),	ЗАКОН РЕСПУБЛИКИ БЕЛАРУСЬ, Об охране окружающей среды, 26 ноября 1992 г. № 1982-XII	http://www.government.by/upload/docs/file/7f314d21163f74f6.PDF
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5.1	7 0	Law "On Nature Conservation" dated November 26, 1992 (National Register of Legal Acts of the Republic of Belarus, 2002, № 85, 2/875),	ЗАКОН РЕСПУБЛИКИ БЕЛАРУСЬ, Об охране окружающей среды, 26 ноября 1992 г. № 1982-XII	http://pravo.by/document/?guid=3871&p0=v19201982
5.3	7 1	Ministerial Decree No. 298 regarding the sphere of competence of the Forest Ministry. 16 March 2004 (revision of 29 July 2006)	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 16 марта 2004 г. № 298 ВОПРОСЫ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ	http://pravo.by/document/?guid=3871&p0=C20400298
5.3	7 2	Decree of the Council of Ministers of the Republic of Belarus dated July 14, 2003 No. 949 "On the National Environmental Monitoring System in the Republic of Belarus"	Постановление Совета Министров Республики Беларусь от 14 июля 2003 г. № 949 "О Национальной системе мониторинга окружающей среды в Республике Беларусь"	http://pravo.levonevsky.org/bazaby09/sbor40/text40725.htm ; http://www.minpriroda.gov.by/en/envmonitoring-en/
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5.3	7 4	LAW OF THE REPUBLIC OF BELARUS of December 18, 2019 No. 272-Z About protection and use of peat bogs.	ЗАКОН РЕСПУБЛИКИ БЕЛАРУСЬ 18 декабря 2019 г. № 272-З Об охране и использовании торфяников	http://pravo.by/upload/docs/op/H11900272_1577394000.pdf
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5.4	7 6	The Code of Administrative Offences No. 194-Z of 21.04.2003.	Кодекс Республики Беларусь об административных правонарушениях от 21 апреля 2003 г. № 194-З	http://pravo.by/document/?guid=3961&p0=Hk0300194
5.4	7 7	Ministry of Natural Resources and Environmental Protection of the Republic of Belarus		http://minpriroda.gov.by/en/
5.4	7 8	Ministerial Decree No. 298 regarding the sphere of competence of the Forest Ministry. 16 March 2004 (revision of 29 July 2006)	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 16 марта 2004 г. № 298 ВОПРОСЫ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ	http://pravo.by/document/?guid=3871&p0=C20400298
6.1	7 9	LEX-FAOC159387: Forest code of the Republic of Belarus (Law No. 332-Z)		http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
6.1	8 0	CODE OF REPUBLIC OF BELARUS ON ADMINISTRATIVE VIOLATIONS № 194-3, April 21, 2003	КОДЕКС РЕСПУБЛИКИ БЕЛАРУСЬ ОБ АДМИНИСТРАТИВНЫХ ПРАВОНАРУШЕНИЯХ, № 194-3, 21 апреля 2003 г.	https://etalonline.by/document/?regnum=Hk0300194
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6.1	8 2	Land code No. 425-Z of 2009		LEX-FAOC092921: Land Code (Law No. 425-Z), http://www.fao.org/faolex/results/details/en/c/LEX-FAOC092921
6.1	8 3	RESOLUTION OF THE COUNCIL OF MINISTERS OF THE REPUBLIC OF BELARUS April 29, 2015 No. 361 "On some issues of preventing land degradation (including soil)"	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 29 апреля 2015 г. № 361 "О некоторых вопросах предотвращения деградации земель (включая почвы)"	https://knowledge.unccd.int/sites/default/files/naps/Belarus-rus.pdf ; https://knowledge.unccd.int/sites/default/files/inline-files/belarus-ldn-country-report.pdf
6.1	8 4	STB 1360-2002. Sustainable forest management. Felling. Requirements to Technology	СТБ 1360-2002 Устойчивое лесопользование и лесопользование. Рубки главного пользования. Требования к технологиям	http://www.tnpa.by/#!/DocumentCard/142215/162656

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6.2	9 0	Forest code of the republic of Belarus No. 332-Z of 2015	Лесной кодекс Республики Беларусь от 24.12.2015 N 332-3	http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
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6.3	9 7	Decree of the Council of Ministers of the Republic of Belarus dated July 14, 2003 No. 949 "On the National Environmental Monitoring System in the Republic of Belarus"	Постановление Совета Министров Республики Беларусь от 14 июля 2003 г. №949 "О Национальной системе мониторинга окружающей среды в Республике Беларусь"	http://pravo.levonevsky.org/bazaby09/sbor40/text40725.htm ; http://www.minpriroda.gov.by/en/envmonitoring-en/
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6.4	9 9	The Code of Administrative Offences No. 194-Z of 21.04.2003.	Кодекс Республики Беларусь об административных правонарушениях от 21 апреля 2003 г. № 194-3	http://pravo.by/document/?guid=3961&p0=Hk0300194
6.4	1 0 0	Ministry of Natural Resources and Environmental Protection		http://minpriroda.gov.by/en/
6.4	1 0 1	Ministerial Decree No. 298 regarding the sphere of competence of the Forest Ministry. 16 March 2004 (revision of 29 July 2006)	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 16 марта 2004 г. № 298 ВОПРОСЫ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ	http://pravo.by/document/?guid=3871&p0=C20400298
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6.4	1 0 3	The Code of Administrative Offences No. 194-Z of 21.04.2003.	Кодекс Республики Беларусь об административных правонарушениях от 21 апреля 2003 г. № 194-3	http://pravo.by/document/?guid=3961&p0=Hk0300194
7.1	1 0 4	LEX-FAOC159387: Forest code of the Republic of Belarus (Law No. 332-Z)		http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
7.1	1 0 5	CODE OF REPUBLIC OF BELARUS ON ADMINISTRATIVE VIOLATIONS № 194-3, April 21, 2003	КОДЕКС РЕСПУБЛИКИ БЕЛАРУСЬ ОБ АДМИНИСТРАТИВНЫХ ПРАВОНАРУШЕНИЯХ, № 194-3, 21 апреля 2003 г.	https://etalonline.by/document/?regnum=Hk0300194
7.1	1 0 6	Procedural-Executive Code of Administrative Offences No. 194-Z of 20.12.2006.	Процессуально-исполнительный кодекс Республики Беларусь об административных правонарушениях № 194-3 20 декабря 2006 г.	http://pravo.by/document/?guid=3871&p0=Hk0600194

7.1	1 0 7	Law of the Republic of Belarus No. 3335-XII of 20.10.1994 "On Specially Protected Natural Territories". The document ceased to be valid since June 14, 2019 according to the Law of the Republic of Belarus of November 15, 2018 No. 150-Z	ЗАКОН РЕСПУБЛИКИ БЕЛАРУСЬ от 20 октября 1994 года №3335-XII "Об особо охраняемых природных территориях"	http://rntbcat.org.by/EK/US/Ecology/68.pdf
7.1	1 0 8	LEX-FAOC037863. Law No. 1982-XII of 1992 on protection of the environment		http://www.fao.org/faolex/results/details/en/c/LEX-FAOC037863/
7.1	1 0 9	LEX-FAOC050616 Plants Act (No. 205-Z of 2003).		http://www.fao.org/faolex/results/details/en/c/LEX-FAOC050616
7.1	1 1 0	LEX-FAOC081393 Wildlife Law (No. 257-Z).		http://www.fao.org/faolex/results/details/en/c/LEX-FAOC081393
7.1	1 1 1	Law "On Nature Conservation" dated November 26, 1992 (National Register of Legal Acts of the Republic of Belarus, 2002, № 85, 2/875),	ЗАКОН РЕСПУБЛИКИ БЕЛАРУСЬ, Об охране окружающей среды, 26 ноября 1992 г. № 1982-XII	http://pravo.by/document/?guid=3871&p0=v19201982
7.1	1 1 2	Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 26 of 09.06.2014 "On Approval of the list of rare and endangered species")		http://redbook.minpriroda.gov.by/
7.1	1 1 3	TCP 17.05-01-2014 (02120). Technical code of common practice. Protection of the environment and wildlife management. Plant world. Protection rules of wild plants belonging to the species included in the Red Book of the Republic of Belarus, and the sites of their location.	ТКР 17.05-01-2014 (02120). Охрана окружающей среды и природопользование. Растительный мир. Правила охраны дикорастущих растений, относящихся к видам, включенным в Красную книгу Республики Беларусь, и мест их произрастания.	https://brestnatura.org/ru/law/ (Visited 13-04-2020)
7.1	1 1 4	TCP 17.07-01-2014 (02120). Protection of the environment and wildlife management. Animal world. Regulations for protection of wild animals belonging to the species included in the Red Book of the Republic of Belarus and their habitats	ТКР 17.07-01-2014 (02120). Охрана окружающей среды и природопользование. Животный мир. Правила охраны диких животных, относящихся к видам, включенным в Красную книгу Республики Беларусь, и мест их обитания	https://brestnatura.org/ru/law/ (Visited 13-04-2020)
7.1	1 1 5	On the National Action Plan for the Conservation and Sustainable Use of Biological Diversity for 2016-2020 and on amendments to the Resolution of the Council of Ministers of the Republic of Belarus № 1707 dated November, 19, 2010		https://www.cbd.int/doc/world/by/by-nbsap-v2-p2-en.pdf
7.1	1 1 6	Convention on Biological Diversity United Nations 1992		https://www.cbd.int/doc/legal/cbd-en.pdf ; https://chm.cbd.int/pdf/documents/nationalReport6/241352/1
7.2	1 1 7	The Code of Administrative Offences No. 194-Z of 21.04.2003.	Кодекс Республики Беларусь об административных правонарушениях от 21 апреля 2003 г. № 194-З	http://pravo.by/document/?guid=3961&p0=Hk0300194
7.2	1 1 8	Ministry of Natural Resources and Environmental Protection of the Republic of Belarus		http://minpriroda.gov.by/en/
7.2	1 1 9	Ministerial Decree No. 298 regarding the sphere of competence of the Forest Ministry. 16 March 2004 (revision of 29 July 2006)	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 16 марта 2004 г. № 298 ВОПРОСЫ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ	http://pravo.by/document/?guid=3871&p0=C20400298
7.2	1 2 0	Forest code of the republic of Belarus No. 332-Z of 2015	Лесной кодекс Республики Беларусь от 24.12.2015 N 332-З	http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
7.2	1 2 1	Law of the Republic of Belarus No. 3335-XII of 20.10.1994 "On Specially Protected Natural Territories". The document ceased to be valid since June 14, 2019 according to the Law of the Republic of Belarus of November 15, 2018 No. 150-Z	ЗАКОН РЕСПУБЛИКИ БЕЛАРУСЬ от 20 октября 1994 года №3335-XII "Об особо охраняемых природных территориях"	http://rntbcat.org.by/EK/US/Ecology/68.pdf
7.3	1 2 2	The Code of Administrative Offences No. 194-Z of 21.04.2003.	Кодекс Республики Беларусь об административных правонарушениях от 21 апреля 2003 г. № 194-З	http://pravo.by/document/?guid=3961&p0=Hk0300194
7.3	1 2 3	Ministry of Natural Resources and Environmental Protection		http://minpriroda.gov.by/en/
7.3	1 2 4	Forest code of the republic of Belarus No. 332-Z of 2015	Лесной кодекс Республики Беларусь от 24.12.2015 N 332-З	LEX-FAOC159387: Forest code of the Republic of Belarus (Law No. 332-Z), http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
7.3	1 2 5	Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 26 of 09.06.2014 "On Approval of the list of rare and endangered species"	Постановление Министерства природных ресурсов и охраны окружающей среды No. 26 of 09.06.2014 "Об утверждении перечня редких и исчезающих видов")	http://redbook.minpriroda.gov.by/ ; http://minpriroda.gov.by/ru/redbook-ru/

7.3	1 2 6	State Inspectorate for Protection of Fauna and Flora under the President of the Republic of Belarus.		http://gosinspekciya.gov.by/information/
7.3	1 2 7	TCP 17.05-01-2014 (02120). Technical code of common practice. Protection of the environment and wildlife management. Plant world. Protection rules of wild plants belonging to the species included in the Red Book of the Republic of Belarus, and the sites of their location.	ТКР 17.05-01-2014 (02120). Охрана окружающей среды и природопользование. Растительный мир. Правила охраны дикорастущих растений, относящихся к видам, включенным в Красную книгу Республики Беларусь, и мест их произрастания.	http://www.tnpa.by/#!/DocumentCard/315779/435262
7.3	1 2 8	TPC 17.07-01-2014 (02120) Environmental protection and management. Animal world. Rules for protection of wild animals, which belong to the species included in the Red Book of the Republic of Belarus, and their habitats.	ТКР 17.07-01-2014 (02120) Охрана окружающей среды и природопользование. Животный мир. Правила охраны диких животных, относящихся к видам, включенным в Красную книгу Республики Беларусь, и мест их обитания	http://www.tnpa.by/#!/DocumentCard/315780/435263
7.4	1 2 9	Ministry of Natural Resources and Environmental Protection		http://minpriroda.gov.by/en/
7.4	1 3 0	Ministerial Decree No. 298 regarding the sphere of competence of the Ministry of Forestry. 16 March 2004 (revision of 29 July 2006)	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 16 марта 2004 г. № 298 ВОПРОСЫ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ	http://pravo.by/document/?guid=3871&p0=C20400298
7.4	1 3 1	State Inspectorate for Protection of Fauna and Flora under the President of the Republic of Belarus.		http://gosinspekciya.gov.by/information/
7.4	1 3 2	TCP 622-2018 Technical requirements for forestry planning. Determinating and taxing of plots in the forests of the Republic of Belarus 01.10.2018	ТКР 622-2018 (33090) Технические требования при лесоустройстве. Отвод и таксация лесосек в лесах Республики Беларусь 01.10.2018	http://www.tnpa.by/#!/DocumentCard/399460/529265
8.1	1 3 3	LEX-FAOC159387 Forest Code: (Law No. 332-Z)		http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
8.1	1 3 4	The Code of Administrative Offences No. 194-Z of 21.04.2003.	Кодекс Республики Беларусь об административных правонарушениях от 21 апреля 2003 г. № 194-З	http://pravo.by/document/?guid=3961&p0=Hk0300194
8.1	1 3 5	Procedural-Executive Code of Administrative Offences No. 194-Z of 20.12.2006.	Процессуально-исполнительный кодекс Республики Беларусь об административных правонарушениях № 194-З 20 декабря 2006 г.	http://pravo.by/document/?guid=3871&p0=Hk0600194
8.1	1 3 6	STB 1708-2006 Sustainable forest management and forest operations. Basic provisions.	СТБ 1708-2006 Устойчивое лесосоуправление и лесопользование. Основные положения.	http://www.tnpa.by/#!/DocumentCard/188829/286070
8.1	1 3 7	STB 1688-2006 Sustainable forest management and forest operations. Requirements to forestry projecting.	СТБ 1688-2006 Устойчивое лесосоуправление и лесопользование. Требования к лесохозяйственному проектированию.	http://www.tnpa.by/#!/DocumentCard/187252/284470
8.1	1 3 8	STB 1582-2005	СТБ 1582-2005 Устойчивое лесосоуправление и лесопользование. Требования к мероприятиям по охране леса.	http://www.tnpa.by/#!/DocumentCard/167036/206186
8.1	1 3 9	TCP 622-2018 Technical requirements for forestry planning. Determinating and taxing of plots in the forests of the Republic of Belarus 01.10.2018	ТКР 622-2018 (33090) Технические требования при лесоустройстве. Отвод и таксация лесосек в лесах Республики Беларусь 01.10.2018	http://www.tnpa.by/#!/DocumentCard/399460/529265
8.1	1 4 0	TCP 575-2015 (33090) Sustainable forest management and forest operations. Guidance on growing planting material of wood and shrub species in forest nurseries of the Republic of Belarus	ТКР 575-2015 (33090) Устойчивое лесосоуправление и лесопользование. Наставление по выращиванию посадочного материала древесных и кустарниковых видов в лесных питомниках Республики Беларусь	http://www.tnpa.by/#!/DocumentCard/341480/465329
8.1	1 4 1	TCP 587-2016 (33090) Sustainable forest management and forest use. Rules for selecting forest types 01.01.2017 Introduced for the first time	ТКР 587-2016 (33090)	http://www.tnpa.by/#!/DocumentCard/362096/489152
8.1	1 4 2	TCP 634-2019 (33090) Procedure for carrying out forest protection measures in forests 01.06.2019	ТКР 634-2019 (33090) Порядок проведения лесозащитных мероприятий в лесах 01.06.2019	http://tnpa.by/
8.2	1 4 3	Forest code of the republic of Belarus No. 332-Z of 2015	Лесной кодекс Республики Беларусь от 24.12.2015 N 332-З	http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
8.2	1 4 4	Ministerial Decree No. 298 regarding the sphere of competence of the Forest Ministry. 16 March 2004 (revision of 29 July 2006)	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 16 марта 2004 г. № 298 ВОПРОСЫ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ	http://pravo.by/document/?guid=3871&p0=C20400298
8.3	1 4 5	The Ministry of Forestry of the Republic of Belarus		https://www.mlh.by/en/about/

8.3	1 4 6	STB 1360-2002. Sustainable forest management. Felling. Requirements to Technology	СТБ 1360-2002 Устойчивое лесопользование и лесопользование. Рубки главного пользования. Требования к технологиям	http://www.tnpa.by/#!/DocumentCard/142215/162656
8.3	1 4 7	STB 1361-2002	СТБ 1361-2002	http://www.tnpa.by/#!/DocumentCard/142216/162657
8.4	1 4 8	Ministerial Decree No. 298 regarding the sphere of competence of the Ministry of Forestry. 16 March 2004 (revision of 29 July 2006)	ПОСТАНОВЛЕНИЕ СОВЕТА МИНИСТРОВ РЕСПУБЛИКИ БЕЛАРУСЬ 16 марта 2004 г. № 298 ВОПРОСЫ МИНИСТЕРСТВА ЛЕСНОГО ХОЗЯЙСТВА РЕСПУБЛИКИ БЕЛАРУСЬ	http://pravo.by/document/?guid=3871&p0=C20400298
8.4	1 4 9	LEX-FAOC081415 Presidential Decree No. 214 on forest conservation measures.	Указ Президента Республики Беларусь от 7 мая 2007 года № 214 «О не некоторых мерах по совершенствованию деятельности в сфере лесного хозяйства» // НРПА РБ. 2007. № 1/8576	http://www.fao.org/faolex/results/details/en/c/LEX-FAOC081415/
8.4	1 5 0	The Code of Administrative Offences No. 194-Z of 21.04.2003.	Кодекс Республики Беларусь об административных правонарушениях от 21 апреля 2003 г. № 194-З	http://pravo.by/document/?guid=3961&p0=Hk0300194
8.4	1 5 1	Procedural-Executive Code of Administrative Offences No. 194-Z of 20.12.2006.	Процессуально-исполнительный кодекс Республики Беларусь об административных правонарушениях № 194-З 20 декабря 2006 г.	http://pravo.by/document/?guid=3871&p0=Hk0600194
8.4	1 5 2	TCP 622-2018 Technical requirements for forestry planning. Determinating and taxating of plots in the forests of the Republic of Belarus 01.10.2018	ТКП 622-2018 (33090) Технические требования при лесоустройстве. Отвод и таксация лесосек в лесах Республики Беларусь 01.10.2018	http://www.tnpa.by/#!/DocumentCard/399460/529265
9	1 5 3	Acceptance 21 September 2016		https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27
10 a1	1 5 4	NDC Belarus:		https://www4.unfccc.int/sites/NDCStaging/Pages/Party.aspx?party=BLR
10 a2	1 5 5			https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Belarus%20First/Belarus_INDC_Rus_25.09.2015.pdf
10 a2	1 5 6			https://unfccc.int/MA/Belarus#eq-3: target for 2020
10 a2	1 5 7			https://unfccc.int/files/national_reports/biennial_reports_and_iar/submitted_biennial_reports/application/pdf/br_2_belarus_eng_for_web.pdf
10 b1	1 5 8	Forestry related measures:		
10 b1	1 5 9	LEX-FAOC159387 Forest Code: (Law No. 332-Z).		http://www.fao.org/faolex/results/details/en/c/LEX-FAOC159387
10 b1	1 6 0	LEX-FAOC175281 Decree No. 907 of the Council of Ministers implementing Forest Code (Law No. 332-Z) http://extwprlegs1.fao.org/docs/pdf/blr175281.pdf		
10 b1	1 6 1	LEX-FAOC164949 Decree No. 4 of the Ministry of Natural Resources and Environmental Protection validating the Regulation on formation and keeping carbon register. http://extwprlegs1.fao.org/docs/pdf/blr164949.pdf		
10 b1	1 6 2	LEX-FAOC081415 Presidential Decree No. 214 on forest conservation measures. http://www.fao.org/faolex/results/details/en/c/LEX-FAOC081415/		
10 b1	1 6 2	LEX-FAOC082985 Order No. 400 of the Ministry of Natural Resources and Environmental Protection validating the Regulation on conservation, demolition, transfer of urban plantations and classification thereof. http://www.fao.org/faolex/results/details/en/c/LEX-FAOC082985/		
10 b1	1 6 4	LAW OF THE REPUBLIC OF BELARUS of December 18, 2019 No. 272-Z About protection and use of peat bogs.	ЗАКОН РЕСПУБЛИКИ БЕЛАРУСЬ 18 декабря 2019 г. № 272-З Об охране и использовании торфяников	http://pravo.by/upload/docs/op/H11900272_1577394000.pdf
10 b1	1 6 5	New law on wetlands to help Belarus implement Paris Agreement.		https://eng.belta.by/society/view/new-law-on-wetlands-to-help-belarus-implement-paris-agreement-84-2020/

10 b1	1 6 6	Forest area and carbon stock increase yearly.		https://data.worldbank.org/indicator/AG.LND.FRST.K2?locations=BY
10 b1	1 6 7	STB1708 is also the national standard for sustainable forest management for PEFC certification.		https://cdn.pefc.org/pefc.org/media/2019-04/93d37076-fb50-4e24-928f-e68a0b824a99/2edba973-fb3e-55d4-8731-651c095f1bbf.pdf
10 b1	1 6 8	TCP 17.08-08-2007 (02120) Environment protection and nature use. Atmosphere. Emissions of pollutants from greenhouse gas and air. Rules for calculation of discharges of fire;	ТКП 17.08-08-2007 (02120) Охрана окружающей среды и природопользование. Атмосфера. Выбросы загрязняющих веществ в парниковых газах в атмосферный воздух. Правила расчета выбросов при пожарах;	http://www.tnpa.by/
10 b1	1 6 9	TPC 17.09-02-2011 (02120) of Environmental Protection and Natural Resources Use. Climate. Emissions and absorption of greenhouse gases. Rules for calculation of emissions and absorption of natural marsh ecological systems, dried peat soils, developed and developed peat soils;	ТКП 17.09-02-2011 (02120) Охрана окружающей среды и природопользование. Климат. Выбросы и поглощение парниковых газов. Правила расчета выбросов и поглощения естественных болотных экосистем, осушенных торфяных почв, выработанных и разрабатываемых торфяных месторождений;	http://www.tnpa.by/
10 b2	1 7 0	LULUCF: The second Biennial Report of the republic of Belarus According to Commitments under the United Nations Framework Convention on Climate Change. Table 1 – Change in greenhouse gas emissions, sectorwise, 1990 – 2012, Gg, CO2 eq p.7		https://unfccc.int/files/national_reports/biennial_reports_and_ar/submitted_biennial_reports/application/pdf/br_2_belarus_eng_for_web.pdf
10 b2	1 7 1	GHG reports Belarus 2019:	NIR Belarus: НАЦИОНАЛЬНЫЙ ДОКЛАД О КАДАСТРЕ антропогенных выбросов из источников и абсорбции поглотителями парниковых газов, не регулируемых Монреальским протоколом за 1990 – 2017 гг. Chapter 6 https://unfccc.int/documents/194790	https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2019
10 b2	1 7 2	CRF Table 10s6:		https://unfccc.int/documents/194782
10 b2	1 7 3	Resolution of the Council of Ministers of the Republic of Belarus No. 485 of 10 April 2006 “On Approval of the Regulations on the Procedure of the State Inventory of Anthropogenic Source Emissions and Greenhouse Gases Sinks Absorption”		
10 b2	1 7 4	Belarus is to review the issue of accounting greenhouse gas emissions and sinks in the LULUCF sector until 2020.		https://unfccc.int/files/national_reports/biennial_reports_and_ar/submitted_biennial_reports/application/pdf/br_2_belarus_eng_for_web.pdf

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=BLR>

² [http://www.fao.org/faostat/en/wood_fuel_production_and_export_\(2018\)](http://www.fao.org/faostat/en/wood_fuel_production_and_export_(2018))

³ An overview of the extensive list of references is included in the appendix to this document.



Canada Background information

Land area	896.56 million hectares ¹
Forest area	347.07 million hectares, 39% ¹
Protected forests	24 million hectares ²
Wood fuel production	1,534,000 m ³ ³
Wood fuel export	35,320 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Canada- British Columbia	
2	Is forestry policy/legislation of national or regional competence?	Regional competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forest Act of 1996⁴ 2. Forest and Range Practices Act of 2002⁵ 3. Forest Planning and Practices Regulation of 2004⁶ 4. Woodlot Licence Planning and Practices Regulation of 2005⁷ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁸	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,9}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁰	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forest and Range Practices Act of 2002⁵ 2. Forest Planning and Practices Regulation of 2004⁶ 3. Woodlot Licence Planning and Practices Regulation of 2005⁷ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹¹	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,12}	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹³	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forest and Range Practices Act of 2002⁵ 2. Forest Planning and Practices Regulation of 2004⁶ 3. Woodlot Licence Planning and Practices Regulation of 2005⁷ 4. Government Action Regulation of 2004¹⁴ 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁵	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹⁶	

5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁷	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forest and Range Practices Act of 2002⁵ 2. Forest Planning and Practices Regulation of 2004⁶ 3. Woodlot Licence Planning and Practices Regulation of 2005⁷ 		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁸	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{19,20}	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ²¹	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forest and Range Practices Act of 2002⁵ 2. Forest Planning and Practices Regulation of 2004⁶ 3. Woodlot Licence Planning and Practices Regulation of 2005⁷ 		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹⁸	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ²²	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ²³	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forest Act of 1996⁴ 2. Forest and Range Practices Act of 2002⁵ 3. Woodlot Licence Planning and Practices Regulation of 2005⁷ 		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ²⁴	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ²⁵	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ²⁶	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ²⁷	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁸	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ²⁹	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=CAN>

² <https://www.nrcan.gc.ca/our-natural-resources/forests-forestry/sustainable-forest-management/conservation-and-protection-canadas-forests/17501>

³ [http://www.fao.org/faostat/en/wood-fuel-production-and-export-\(2018\)](http://www.fao.org/faostat/en/wood-fuel-production-and-export-(2018))

⁴ http://www.bclaws.ca/civix/document/id/complete/statreg/96157_01

⁵ http://www.bclaws.ca/civix/document/id/complete/statreg/02069_01

⁶ http://www.bclaws.ca/civix/document/id/loo83/loo83/12_14_2004

⁷ http://www.bclaws.ca/civix/document/id/lc/statreg/21_2004

⁸ http://www.bclaws.ca/civix/document/id/consol21/consol21/00_02069_01#section87

⁹ Forest & Range Evaluation Program: <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/integrated-resource-monitoring/forest-range-evaluation-program>

¹⁰ http://www.bclaws.ca/civix/document/id/complete/statreg/02069_01

¹¹ http://www.bclaws.ca/Recon/document/ID/freeside/00_02069_01#section29

¹² <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/integrated-resource-monitoring/forest-range-evaluation-program>

¹³ http://www.bclaws.ca/civix/document/id/complete/statreg/02069_01

¹⁴ http://www.bclaws.ca/civix/document/id/complete/statreg/582_2004

¹⁵ http://www.bclaws.ca/civix/document/id/complete/statreg/96344_01

¹⁶ https://www.zoology.ubc.ca/biodiversity/centre/hotspots/hotspot_report_no_maps.pdf

¹⁷ https://www.for.gov.bc.ca/dsi/Stewardship/Objectives_for_Biodiversity.htm

¹⁸ http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/12_14_

¹⁹ http://www.bclaws.ca/civix/document/id/complete/statreg/02069_01

²⁰ <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/integrated-resource-monitoring/forest-range-evaluation-program/frep-monitoring-protocols/soils>

²¹ https://www.for.gov.bc.ca/dsi/Stewardship/Objectives_for_Biodiversity.htm

²² <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/integrated-resource-monitoring/forest-range-evaluation-program/frep-monitoring-protocols/biodiversity>

²³ https://www.for.gov.bc.ca/dsi/Stewardship/Objectives_for_Biodiversity.htm

²⁴ <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources>

²⁵ <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/integrated-resource-monitoring/forest-range-evaluation-program/frep-monitoring-protocols/timber>

²⁶ <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/integrated-resource-monitoring/forest-range-evaluation-program/frep-monitoring-protocols/timber>

²⁷ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

²⁸ <https://www4.unfccc.int/sites/NDCStaging/Pages/Party.aspx?party=CAN>

²⁹ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Canada%20First/Canada%20First%20NDC-Revised%20submission%202017-05-11.pdf>



Canada Background information

Land area	896.56 million hectares ¹
Forest area	347.07 million hectares, 39% ¹
Protected forests	24 million hectares ²
Wood fuel production	1,534,000 m ³ ³
Wood fuel export	35,320 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Canada- Quebec	
2	Is forestry policy/legislation of national or regional competence?	Regional competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	1. Sustainable Forest Development Act of 1972 ⁴		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,6}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁷	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	1. Sustainable Forest Development Act of 1972 ⁴		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁵	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁵	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	1. Sustainable Forest Development Act of 1972 ⁴ 2. Natural Heritage Conservation Act of 2002 ⁸ 3. Environment Quality Act of 1972 ⁹ 4. Regulation respecting the application of the Environment Quality Act ¹⁰ 5. Bill 132 of 2017 chapter 14 ¹¹		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ¹²	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,13}	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁴	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	

	1. Sustainable Forest Development Act of 1972 ⁴		
	2.		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ¹⁵	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁶	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	1. Sustainable Forest Development Act of 1972 ⁴		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁵	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁶	
8	Maintenance and improvement of long-term production capacity	Yes	
8.1	Law name and date?	(see below)	
	1. Sustainable Forest Development Act of 1972 ⁴		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁵	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ⁵	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁶	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ¹⁷	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹⁸	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ¹⁹	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=CAN>, 2016 values

² <https://www.nrcan.gc.ca/our-natural-resources/forests-forestry/sustainable-forest-management/conservation-and-protection-canadas-forests/17501>

³ <http://www.fao.org/faostat/en/> wood fuel production and export (2018)

⁴ <http://legisquebec.gouv.qc.ca/en/ShowDoc/cr/A-18.1,%20r.%208.1>

⁵ <http://legisquebec.gouv.qc.ca/en/ShowDoc/cs/A-18.1>

⁶ <http://legisquebec.gouv.qc.ca/en/ShowDoc/cr/A-18.1,%20r.%208.1>

⁷ https://www.sfmcanada.org/images/Publications/EN/QC_info_Provinces_and_territories_EN.pdf

⁸ <http://legisquebec.gouv.qc.ca/en/showDoc/cs/C-61.01?&digest=>

⁹ <http://legisquebec.gouv.qc.ca/en/showDoc/cs/C-61.01?&digest=>

¹⁰ <http://legisquebec.gouv.qc.ca/en/ShowDoc/cs/Q-2/>

¹¹ <http://legisquebec.gouv.qc.ca/en/ShowDoc/cr/Q-2,%20r.%203>

¹² http://legisquebec.gouv.qc.ca/en/showdoc/cs/C-61.01?langCont=en#ga:l_v-gb:l_ji-h1

¹³ <http://www.legisquebec.gouv.qc.ca/en/showdoc/cs/Q-2>

¹⁴ <https://www.ducks.ca/stories/policy/quebecs-new-law/>

¹⁵ <http://legisquebec.gouv.qc.ca/en/ShowDoc/cr/A-18.1,%20r.%200.01/>

¹⁶ <http://www.legisquebec.gouv.qc.ca/en/showdoc/cs/Q-2>

¹⁷ https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

¹⁸ <https://www4.unfccc.int/sites/NDCStaging/Pages/Party.aspx?party=CAN>

¹⁹ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Canada%20First/Canada%20First%20NDC-Revised%20submission%202017-05-11.pdf>



Background information

Land area	1,637 million hectares ¹
Forest area	815 million hectares, 31% ¹
Protected forests and forests under Natura 2000	unknown
Wood fuel production	16,431,453 m ³ ²
Wood fuel export	174,865 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Russian Federation	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	Reference 1-25 (See appendix for an overview of references) ³	
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes (reference 26-29)	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes (reference 30-34)	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes (reference 35-38)	
4	Forest regeneration of harvested area	Yes	Please note that there is evidence identified that indicates that the current legislation might not ensure forest regeneration
4.1	Law name and date?	Reference 39-50	Legislation does exist, but NGO publications exist to indicate that the current set up of legislation is not ensuring appropriate forest regeneration. No evidence from international government organisations was identified to substantiate a NO here.
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes (reference 51-58)	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes (reference 59-61)	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes (reference 62-63)	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	Reference 64-77	
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes (reference 78-79)	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes (reference 80)	

5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes (reference 81-84)	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	Reference 85-90	
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes (reference 91-93)	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes (reference 94)	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes (reference 95-96)	
7	Maintenance of biodiversity to minimize negative impact	Yes	Please note that there are publications encountered that the current protection through HCV values might be insufficient to minimize negative impacts on biodiversity
7.1	Law name and date?	Reference 197-108	NGO publications refer to a broader need for biodiversity protection. However, since the basic laws exists, the criterion is set to Yes.
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes (reference 109-110)	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes (reference 111)	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes (reference 112-113)	
8	Maintenance and improvement of long-term production capacity	Yes	Please note that there is evidence identified that indicates that the current legislation might not ensure the maintenance of long-term production capacity
8.1	Law name and date?	Reference 114-119	Some reports are available indicating that the actual long-term production capacity of Russian forests has been declining, so the legislation is available, but might not obtain the required effect.
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes (reference 120-123)	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes (reference 124-126)	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes (reference 124-126)	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes (reference 127-129)	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	No (reference 130)	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	No	
10.b.i	The country has national laws in place, applicable to the harvest area, to conserve and enhance carbon stock and sinks over the long term?	Yes (reference 131-136)	
10.b.ii	The country can provide evidence that reported LULUCF sector emissions to not exceed removal?	Yes (reference 137)	

Russia – overview of references

Q	Ref #	Description	Description in native language	Reference
3.1	1	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)	Лесной кодекс Российской Федерации от 04.12.2006 N 200-ФЗ (ред. от 27.12.2018)	http://www.leskodeks.ru/
3.1	2	Code of administrative offences of the Russian Federation of 30.12.2001 No.195-FZ (revision of 18.03.2020)	Кодекс Российской Федерации об административных правонарушениях от 30.12.2001 N 195-ФЗ (ред. от 18.03.2020)	http://www.consultant.ru/document/cons_doc_LAW_34661/
3.1	3	Order of the Ministry of Natural Resources No. 692 of 20.12.2017 "On approval of sample form and content of forest management plans of subjects of the Russian Federation and its development and amending procedures"	Приказ Минприроды России от 20.12.2017 N 692 "Об утверждении типовой формы и состава лесного плана субъекта Российской Федерации, порядка его подготовки и внесения в него изменений".	http://www.consultant.ru/document/cons_doc_LAW_295497/
3.1	4	Order of Ministry of Natural Resources of 27.02.2017 No.72 "on approving the content of forest district plans, procedure for their development, duration time and amending procedure"	Приказ Минприроды России от 27.02.2017 N 72 "Об утверждении состава лесохозяйственных регламентов, порядка их разработки, сроков их действия и порядка внесения в них изменений"	https://rulaws.ru/acts/Prikaz-Minprirody-Rossii-ot-27.02.2017-N-72/
3.1	5	Order of the Federal Forestry Agency No. 69 of 29 February 2012. "Content of a forest development project and a procedure for its development"	Приказ Рослесхоза от 29.02.2012 N 69 "Об утверждении состава проекта освоения лесов и порядка его разработки"	http://www.consultant.ru/document/cons_doc_LAW_129583/
3.1	6	Order of the Ministry of Natural Resources No. 17 of 16 January 2015 "On approving a sample form for a forest declaration, procedures for its development and submission, requirements for electronic version of forest declaration"	Приказ Минприроды России от 16.01.2015 N 17 "Об утверждении формы лесной декларации, порядка ее заполнения и подачи, требований к формату лесной декларации в электронной форме"	http://www.consultant.ru/document/cons_doc_LAW_175910/
3.1	7	Decree of the Government of the Russian Federation of June 22, 2007 No. 394 "On approval of the Regulation on the implementation of federal state forest supervision (forest protection)" (redaction of 02.03.2019)	Постановление правительства Российской Федерации от 22 июня 2007 г. № 394 "Об утверждении Положения об осуществлении федерального государственного лесного надзора (лесной охраны)"	http://pravo.gov.ru/proxy/ips/?docbody=&nd=102114904&rdk=&backlink=1
3.1	8	Order of the Ministry of Natural Resources and Ecology of the Russian Federation dated April 12, 2016 N 233 "On Approving the Administrative Regulation for the Execution of the State Function for the Implementation of the Federal State Forestry Supervision (Forest Protection)"	Приказ Министерства природных ресурсов и экологии Российской Федерации от 12 апреля 2016 г. N 233 "Об утверждении административного регламента исполнения государственной функции по осуществлению Федерального государственного лесного надзора (лесной охраны)"	https://prirodnadzor.admhmao.ru/kontrolno-nadzornaya-deyatelnost/dokumenty/les/715746/prikaz-mpr-rf-ob-utverzhenii-administrativnogo-reglamenta-ispolneniya-gosudarstvennoy-funktsii-po-o
3.1	9	Water Code of the Russian Federation of 03.06.2006 No.74-FZ (revision of 02.08.2019)	Водный кодекс Российской Федерации от 03.06.2006 N 74-ФЗ (ред. от 02.08.2019) (с изменениями и дополнениями, вступившими в силу с 01.01.2020)	http://www.consultant.ru/document/cons_doc_LAW_60683/
3.1	10	Federal Law No 33-FZ of 14.03.1995 "On specially protected nature areas" (revision of 26.07.2019)	Федеральный закон от 14 марта 1995 г. N 33-ФЗ "Об особо охраняемых природных территориях"(с изменениями на 26 июля 2019 года)	http://base.garant.ru/10107990/
3.1	11	Decree of the Government of the Russian Federation of 20.05.2017 No.607 "On the rules of sanitary security in the forests"	Постановление Правительства РФ от 20.05.2017 N 607 "О Правилах санитарной безопасности в лесах"	http://www.consultant.ru/document/cons_doc_LAW_217315/
3.1	12	Decree of the Government of the Russian Federation of 30.06.2007 No.417 (revision of 17.04.2019) "On the approval of the fire safety rules in forests"	Постановление Правительства РФ от 30.06.2007 N 417 "Об утверждении Правил пожарной безопасности в лесах" (ред. от 17.04.2019)	http://www.consultant.ru/document/cons_doc_LAW_69502/
3.1	13	Decree of the Government of the Russian Federation of 26.12.2014 No.1525 "On the approval of rules for accounting for wood"	Постановление Правительства РФ от 26.12.2014 N 1525 "Об утверждении Правил учета древесины"	http://www.consultant.ru/document/cons_doc_LAW_173066/
3.1	14	Resolution of the Plenum of the Supreme Court of the Russian Federation of 18.10.2012 No. 21 (as revision of on 30.11.2017) "On the application by courts of legislation for violations in the field of environmental protection and nature management"	Постановление Пленума Верховного Суда Российской Федерации от 18 октября 2012 г. N 21 г. Москва "О применении судами законодательства об ответственности за нарушения в области охраны окружающей среды и природопользования" (с изменениями и дополнениями от 30.11.2017)	http://base.garant.ru/70246708/
3.1	15	Order of the Ministry of Natural Resources No. 693 of 20.12.2017 «On approving of standard contract for taking forest unit in lease»	Приказ Министерства природных ресурсов и экологии РФ от 20 декабря 2017 г. N 693 "Об утверждении типовых договоров аренды лесных участков" (с изменениями и дополнениями)	https://base.garant.ru/71907890/

3.1	16	Order of the Ministry of Natural Resources of 13.09.2016 No.474 (revision of 11.01.2017) «On approval of the rules for timber harvesting and the features of timber harvesting in forest districts, forest parks, specified in Article 23 of the Forest Code of the Russian Federation»	Приказ Министерства природных ресурсов и экологии РФ от 13 сентября 2016 г. № 474 "Об утверждении Правил заготовки древесины и особенностей заготовки древесины в лесничествах, лесопарках, указанных в статье 23 Лесного кодекса Российской Федерации"	https://www.garant.ru/products/ipo/prime/doc/71480564/
3.1	17	Order of the Ministry of Natural Resources and Ecology of the Russian Federation of June 27, 2016 N 367 "On approval of the Types of logging operations, the procedure and sequence for their implementation, the form of the technological map of logging operations, the form of the inspection certificate for the cutting area and the inspection procedure for the cutting area"	Приказ Министерства природных ресурсов и экологии российской федерации от 27 июня 2016 года N 367 "Об утверждении Видов лесосечных работ, порядка и последовательности их проведения, формы технологической карты лесосечных работ, формы акта осмотра лесосеки и порядка осмотра лесосеки"	http://docs.cntd.ru/document/420367623
3.1	18	Order of the Ministry of Natural Resources of 22.11.2017 No.626 « On the approval of the rules for forest maintenance» (revision of 01.11.2018)	Приказ Минприроды России от 22.11.2017 N 626 "Об утверждении Правил ухода за лесами" (ред. от 01.11.2018)	http://www.consultant.ru/document/cons_doc_LAW_286334/1895a8e2e8201c522dffaa1159b6db7feb6ff1eb/
3.1	19	Order of the Ministry of Natural Resources No.181 of 16.07.2007 "On approval of special terms for usage, tending, protection, reforestation for forests located in nature reserves" (revision of 12.03.2008)	Приказ МПР РФ от 16.07.2007 N 181 "Об утверждении Особенности использования, охраны, защиты, воспроизводства лесов, расположенных на особо охраняемых природных территориях" (ред. от 12.03.2008)	http://www.consultant.ru/document/cons_doc_LAW_70835/
3.1	20	Order of Federal Forestry Agency No. 513 of 5 December 2011 "On approving the list of tree and shrub species for which timber harvesting is not allowed"	Приказ федерального агентства лесного хозяйства от 5 декабря 2011 года N 513 "Об утверждении Перечня видов (пород) деревьев и кустарников, заготовка древесины которых не допускается"	http://docs.cntd.ru/document/902319931
3.1	21	Order of Federal Forestry Agency No.105 of 09.04.2015 "On verification of felling age"	Приказ Рослесхоза от 09.04.2015 N 105 (ред. От 02.07.2015) "Об установлении возрастов рубок"	https://rulings.ru/acts/Prikaz-Rosleshoza-ot-09.04.2015-N-105/
3.1	22	Resolution of the Plenum of the Supreme Court of the Russian Federation of 18.10.2012 No. 21 (as revision of on 30.11.2017) "On the application by courts of legislation for violations in the field of environmental protection and nature management"	Приказ Министерства природных ресурсов и экологии Российской Федерации от 21 января 2014 г. N 21 "Об утверждении нормативов патрулирования лесов должностными лицами, осуществляющими федеральный государственный лесной надзор (лесную охрану)"	http://docs.cntd.ru/document/499073820
3.1	23	Penal Code No. 63-FZ of 13.06.1996 (revision of 01.04.2020)	Уголовный кодекс Российской Федерации от 13.06.1996 N 63-ФЗ (ред. от 01.04.2020)	http://www.consultant.ru/document/cons_doc_LAW_10699/
3.1	24	Federal Law No. 415-FZ of December 28, 2013 'On Amendments to the Forest Code of the Russian Federation and the Code of the Russian Federation on Administrative Offenses'	Федеральный закон "О внесении изменений в Лесной кодекс Российской Федерации и Кодекс Российской Федерации об административных правонарушениях" от 28.12.2013 N 415-ФЗ (последняя редакция)	https://rg.ru/2013/12/30/drevesina-dok.html
3.1	25	Federal Law "On Amending Certain Legislative Acts of the Russian Federation" dated 07.21.2014 N 277-FZ	Федеральный закон "О внесении изменений в отдельные законодательные акты Российской Федерации" от 21.07.2014 N 277-ФЗ	http://www.consultant.ru/document/cons_doc_LAW_165850/
3.2	26	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)		http://www.leskodeks.ru/
3.2	27	Decree of the Government of the Russian Federation of June 22, 2007 No. 394 "On approval of the Regulation on the implementation of federal state forest supervision (forest protection)" (redaction of 02.03.2019)		http://base.garant.ru/12154199/
3.2	28	Order of the Ministry of Natural Resources No. 17 of 16 January 2015 "On approving a sample form for a forest declaration, procedures for its development and submission, requirements for electronic version of forest declaration"		http://www.consultant.ru/document/cons_doc_LAW_175910/
3.2	29	Russian Federation country overview to aid implementation of the EUTR, September 2018, UN Environment WCMC		https://ec.europa.eu/environment/forests/pdf/Country_overview_Russian_Federation_03_10_2018.pdf
3.3	30	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)		http://www.leskodeks.ru/
3.3	31	Federal Law No. 415-FZ of December 28, 2013 'On Amendments to the Forest Code of the Russian Federation and the Code of the Russian Federation on Administrative Offenses'		https://rg.ru/2013/12/30/drevesina-dok.html
3.3	32	Federation and the Code of the Russian Federation on Administrative Offenses'		http://www.consultant.ru/document/cons_doc_LAW_156534/
3.3	33	Order of the Ministry of Natural Resources and Ecology of the Russian Federation dated April 12,		http://www.consultant.ru/document/cons_doc_LAW_204106/

		2016 N 233 "On Approving the Administrative Regulation for the Execution of the State Function for the Implementation of the Federal State Forestry Supervision (Forest Protection)"		
3.3	34	Order of the Ministry of Natural Resources and Ecology of the Russian Federation of January 21, 2014 N 21 "On the Approval of Standards for Forest Patrol by Officials Implementing Federal State Forestry Supervision (Forest Protection)"		http://www.consultant.ru/document/cons_doc_LAW_160161/c6871cb6a1541d21cb581a33bf1742b3b4bcc13c/
3.4	35	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)		http://www.leskodeks.ru/
3.4	36	Decree of the Government of the Russian Federation of June 22, 2007 No. 394 "On approval of the Regulation on the implementation of federal state forest supervision (forest protection)" (redaction of 02.03.2019)		http://base.garant.ru/12154199/
3.4	37	Code of administrative offences of the Russian Federation of 30.12.2001 No.195-FZ (revision of 18.03.2020)		http://www.consultant.ru/document/cons_doc_LAW_34661/
3.4	38	Federal Law "On Amending Certain Legislative Acts of the Russian Federation" dated 07.21.2014 N 277-ФЗ		http://www.consultant.ru/document/cons_doc_LAW_165850/
4.1	39	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (edited 27.12.2018)	Лесной кодекс Российской Федерации от 04.12.2006 N 200-ФЗ (ред. от 27.12.2018)	http://www.leskodeks.ru/
4.1	40	Order of the Ministry of Natural Resources and Ecology of the Russian Federation dated March 25, 2019 N 188 On the approval of the rules of reforestation, composition of the project of reforestation, the order of development of the project of reforestation and changes (as amended on August 14, 2019).	Приказ Министерства природных ресурсов и экологии Российской Федерации от 25 марта 2019 года N 188 Об утверждении Правил лесовосстановления, состава проекта лесовосстановления, порядка разработки проекта лесовосстановления и внесения в него изменений (с изменениями на 14 августа 2019 года)	http://www.consultant.ru/document/cons_doc_LAW_295497/
4.1	41	Order of the Ministry of Natural Resources and Environment of the Russian Federation of March 11, 2019 N 150 On the approval of the Procedure for assigning lands intended for reforestation to the lands where forests are located and the forms of the relevant act	Приказ Министерства природных ресурсов и экологии Российской Федерации от 11 марта 2019 года N 150 Об утверждении Порядка отнесения земель, предназначенных для лесовосстановления, к землям, на которых расположены леса, и формы соответствующего акта	https://rulaws.ru/acts/Prikaz-Minprirody-Rossii-ot-27.02.2017-N-72/
4.1	42	Order of the Ministry of Natural Resources and Environment of the Russian Federation of February 19, 2015 N 59 On the approval of the implementation of state monitoring of forest reproduction.	Приказ Министерства природных ресурсов и экологии Российской Федерации от 19 февраля 2015 года N 59 Об утверждении порядка осуществления государственного мониторинга воспроизводства лесов	http://www.consultant.ru/document/cons_doc_LAW_129583/
4.1	43	Order of the Ministry of Natural Resources and Environment of the Russian Federation dated January 20, 2015 N28 On establishing the order of presentation of the report on forest reproduction and afforestation and its forms.	Приказ Министерства природных ресурсов и экологии Российской Федерации от 20 января 2015 года N28 Об установлении порядка представления отчета о воспроизводстве лесов и лесоразведении и его формы	http://docs.cntd.ru/document/554151577/
4.1	44	Code of Administrative Offences of the Russian Federation of 30.12.2001 No.195-FZ (edited 18.03.2020)	Кодекс Российской Федерации об административных правонарушениях от 30.12.2001 N 195-ФЗ (ред. от 18.03.2020)	https://www.garant.ru/products/ipo/prime/doc/72153418/
4.1	45	Federal Law of July 19, 2018 No. 212-ФЗ "On Amending the Forest Code of the Russian Federation and Certain Legislative Acts of the Russian Federation Regarding Improving Forest Reproduction and Afforestation"	Федеральный закон от 19 июля 2018 г. №212-ФЗ «О внесении изменений в Лесной кодекс Российской Федерации и отдельные законодательные акты Российской Федерации в части совершенствования воспроизводства лесов и лесоразведения»	http://www.consultant.ru/document/cons_doc_LAW_185523/66726eaa6d6877343328883e7654215e8679ee8e/
4.1	46	Order of the president of the Russian Federation of May 7, 2018 no. 204 "on national goals and strategic tasks of development of the Russian federation for the period up to 2024"	Указ президента российской федерации от 7 мая 2018 года № 204 «О национальных целях и стратегических задачах развития российской федерации на период до 2024 года»	http://www.consultant.ru/document/cons_doc_LAW_179135/
4.1	47	Code of Administrative Offences of the Russian Federation of 30.12.2001 No.195-FZ (edited 18.03.2020)		http://www.consultant.ru/document/cons_doc_LAW_34661/
4.1	48	Federal Law of July 19, 2018 No. 212-ФЗ "On Amending the Forest Code of the Russian Federation and Certain Legislative Acts of the Russian Federation Regarding Improving Forest Reproduction and Afforestation"		http://www.consultant.ru/document/cons_doc_LAW_302854/
4.1	49	Order of the president of the Russian federation of May 7, 2018 no. 204 "On national goals and		https://minenergo.gov.ru/view-pdf/11246/84473

		strategic tasks of development of the Russian Federation for the period up to 2024"		
4.1	50	Federal project "Forest Conservation" of the National Project "Ecology", October 1, 2018 (to 31 December 2014)		http://www.mnr.gov.ru/upload/medialibrary/5e7/ecology.pdf
4.2	51	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)	Лесной кодекс Российской Федерации от 04.12.2006 N 200-ФЗ (ред. от 27.12.2018)	http://www.leskodeks.ru/
4.2	52	Order of the Ministry of Natural Resources No. 692 of 20.12.2017 "On approval of sample form and content of forest management plans of subjects of the Russian Federation and its development and amending procedures"	Приказ Минприроды России от 20.12.2017 N 692 "Об утверждении типовой формы и состава лесного плана субъекта Российской Федерации, порядка его подготовки и внесения в него изменений".	http://www.consultant.ru/document/cons_doc_LAW_295497/
4.2	53	Order of Ministry of Natural Resources of 27.02.2017 No.72 "on approving the content of forest district plans, procedure for their development, duration time and amending procedure"	Приказ Минприроды России от 27.02.2017 N 72 "Об утверждении состава лесохозяйственных регламентов, порядка их разработки, сроков их действия и порядка внесения в них изменений"	https://rulaws.ru/acts/Prikaz-Minprirody-Rossii-ot-27.02.2017-N-72/
4.2	54	Order of the Federal Forestry Agency No. 69 of 29 February 2012. "Content of a forest development project and a procedure for its development"	Приказ Рослесхоза от 29.02.2012 N 69 "Об утверждении состава проекта освоения лесов и порядка его разработки"	http://www.consultant.ru/document/cons_doc_LAW_129583/
4.2	55	Order of the Ministry of Natural Resources and Ecology of the Russian Federation dated March 25, 2019 N 188 On the approval of the rules of reforestation, composition of the project of reforestation, the order of development of the project of reforestation and changes (as amended on August 14, 2019).	Приказ Министерства природных ресурсов и экологии Российской Федерации от 25 марта 2019 года N 188 Об утверждении Правил лесовосстановления, состава проекта лесовосстановления, порядка разработки проекта лесовосстановления и внесения в него изменений (с изменениями на 14 августа 2019 года)	http://docs.cntd.ru/document/554151577/
4.2	56	Order of March 29, 2018 N 122 On the approval of the Forest Management Instructions (as amended on February 6, 2020)	Приказ от 29 марта 2018 года N 122 Об утверждении Лесостроительной инструкции (с изменениями на 6 февраля 2020 года)	http://docs.cntd.ru/document/542621790/
4.2	57	Reforestation in Russia, causes of inefficiency and anti-crisis measures, Evgeny Schwartz, Nikolay Shmatkov, Konstantin Kobayakov, LesPromInform No. 4 (142), 2019	Лесовосстановление в России, Причины неэффективности и антикризисные меры. Евгений Шварц, Николай Шматов, Константин Кобяков. ЛесПромИнформ № 4 (142), 2019	https://lesprominform.ru/jarticles.html?id=5360
4.2	58	Aor restoration of forests in 2019, more than 110 million pieces of saplings have been grown in the nurseries of the NWFД. Forest agency of Russia, 25 July 2019	Для восстановления лесов в 2019 году в питомниках СЗФО выращено более 110 млн штук саженцев. Рослесхоз, 25 Июля 2019	http://rosleshoz.gov.ru/news/2019-07-25/%D1%81%D0%B7%D1%84%D0%BE_3155
4.3	59	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)		http://www.leskodeks.ru/
4.3	60	Order of the Ministry of Natural Resources and Ecology of the Russian Federation of February 19, 2015 N 59 on approval of the procedure for state monitoring of forest reproduction	Приказ Министерства природных ресурсов и экологии Российской Федерации от 19 февраля 2015 года N 59 об утверждении порядка осуществления государственного мониторинга воспроизводства лесов	http://www.consultant.ru/document/cons_doc_LAW_185523/66726eaa6d687734328883e7654215e8679ee8e/
4.3	61	Reforestation in Russia, causes of inefficiency and anti-crisis measures, Evgeny Schwartz, Nikolay Shmatkov, Konstantin Kobayakov, LesPromInform No. 4 (142), 2019		https://lesprominform.ru/jarticles.html?id=5360
4.4	62	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)	Лесной кодекс Российской Федерации от 04.12.2006 N 200-ФЗ (ред. от 27.12.2018)	http://www.leskodeks.ru/
4.4	63	Code of administrative offences of the Russian Federation of 30.12.2001 No.195-FZ (revision of 18.03.2020)	Кодекс Российской Федерации об административных правонарушениях от 30.12.2001 N 195-ФЗ (ред. от 18.03.2020)	http://www.consultant.ru/document/cons_doc_LAW_34661/
5.1	64	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)	Лесной кодекс Российской Федерации от 04.12.2006 N 200-ФЗ (ред. от 27.12.2018)	http://www.leskodeks.ru/
5.1	65	Order of the Ministry of Natural Resources No.181 of 16.07.2007 "On approval of special terms for using, tending, protecting, and regenerating forests in especially protected natural areas"	Приказ МПР РФ от 16 июля 2007 г. № 181 "Об утверждении Особенности использования, охраны, защиты, воспроизводства лесов, расположенных на особо охраняемых природных территориях"	https://www.garant.ru/products/ipo/prime/doc/12055425/
5.1	66	Code of Administrative Offences of the Russian Federation of 30.12.2001 No.195-FZ (edited 18.03.2020)	Кодекс Российской Федерации об административных правонарушениях от 30.12.2001 N 195-ФЗ (ред. от 18.03.2020)	http://www.consultant.ru/document/cons_doc_LAW_34661/
5.1	67	Federal Law No. 7-FZ of 10 January 2002 (edited 27.12.2019) "On Environment Conservation"	Федеральный закон от 10.01.2002 N 7-ФЗ (ред. от 27.12.2019) "Об охране окружающей среды"	https://legalacts.ru/doc/FZ-ob-ohrane-okruzhajujey-sredy/
5.1	68	Order of the Ministry of Natural Resources of 13.09.2016 No.474 (edited 11.01.2017) «On approval of the rules for timber harvesting and the features of timber harvesting in forest districts,	Приказ Министерства природных ресурсов и экологии РФ от 13 сентября 2016 г. № 474 "Об утверждении Правил заготовки древесины и особенностей заготовки	https://www.garant.ru/products/ipo/prime/doc/71480564/

		forest parks, specified in Article 23 of the Forest Code of the Russian Federation»	древесины в лесничествах, лесопарках, указанных в статье 23 Лесного кодекса Российской Федерации"	
5.1	69	Order of March 29, 2018 N 122 On the approval of the Forest Management Instructions (as amended on February 6, 2020)	Постановление Правительства РФ от 30.07.2004 N 400 (ред. от 27.07.2019) "Об утверждении Положения о Федеральной службе по надзору в сфере природопользования и внесении изменений в Постановление Правительства Российской Федерации от 22 июля 2004 г. N 370" (с изм. и доп., вступ. в силу с 01.01.2020)	http://docs.cntd.ru/document/542621790/
5.1	70	Federal Law No 33-FZ of 14.03.1995 (with the changes of 26.07.2019) "On Specially Protected Nature Areas"	Федеральный закон от 14 марта 1995 г. N 33-ФЗ "Об особо охраняемых природных территориях" (с изменениями на 26 июля 2019 года)	http://www.consultant.ru/document/cons_doc_LAW_48720/
5.1	71	Order of the Federal Service for Supervision in the Sphere of Nature Management of 19.10.2011 No.761 "On permitted activities in the field of conservation of biological diversity"	Приказ Росприроднадзора от 19.10.2011 N 761 О разрешительной деятельности в сфере сохранения биологического разнообразия	http://base.garant.ru/10107990/
5.1	72	Order of the Ministry of Natural Resources of the Russian Federation of 29.05.2017 г. No. 264 «On the approval of the specific approach to protection in the forests of rare and endangered trees, bushes, lianas, other forest plants listed in the Red Book of the Russian Federation or red books of the subjects of the Russian Federation"	Приказ Министерства природных ресурсов и экологии российской федерации от 29 мая 2017 года N 264 "Об утверждении Особенности охраны в лесах редких и находящихся под угрозой исчезновения деревьев, кустарников, лиан, иных лесных растений, занесенных в Красную книгу Российской Федерации или красные книги субъектов Российской Федерации"	https://ppt.ru/docs/prikaz/rosprirnodzor/n-761-92660/
5.1	73	Order of March 29, 2018 N 122 On the approval of the Forest Management Instructions (as amended on February 6, 2020)	Приказ от 29 марта 2018 года N 122 Об утверждении Лесостроительной инструкции (с изменениями на 6 февраля 2020 года)	http://docs.cntd.ru/document/542601195/
5.1	74	Water Code of the Russian Federation of 03.06.2006 No.74-FZ (revision of 02.08.2019)	Водный кодекс Российской Федерации от 03.06.2006 N 74-ФЗ (ред. от 02.08.2019) (с изменениями и дополнениями, вступившими в силу с 01.01.2020)	http://www.consultant.ru/document/cons_doc_LAW_60683/
5.1	75	Federal Law "On Amendments to the Forest Code of the Russian Federation and certain legislative acts of the Russian Federation regarding the improvement of legal regulation of relations related to ensuring the conservation of forests on lands of the forest fund and lands of other categories" dated December 27, 2018 N 538-ФЗ (latest revision)	Федеральный закон "О внесении изменений в Лесной кодекс Российской Федерации и отдельные законодательные акты Российской Федерации в части совершенствования правового регулирования отношений, связанных с обеспечением сохранения лесов на землях лесного фонда и землях иных категорий" от 27.12.2018 N 538-ФЗ (последняя редакция)	http://www.consultant.ru/document/cons_doc_LAW_314666/
5.1	76	Order of the Federal Forestry Agency (Rosleskhoz) of May 27, 2011 N 191 "On approval of the procedure for calculating the estimated cutting area"	Приказ Федерального агентства лесного хозяйства (Рослесхоз) от 27 мая 2011 г. N 191 "Об утверждении Порядка исчисления расчетной лесосеки"	https://rg.ru/2011/07/07/lesoseka-site-dok.html
5.1	77	Convention on Wetlands of International Importance, mainly as habitats for waterfowl (Ramsar 1971, as amended in 1982 and 1987)		https://unesdoc.unesco.org/ark:/48223/pf0000261400_rus
5.2	78	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)		http://www.leskodeks.ru/
5.2	79	Order of the Ministry of Natural Resources of 13.09.2016 No.474 (revision of 11.01.2017) «On approval of the rules for timber harvesting and the features of timber harvesting in forest districts, forest parks, specified in Article 23 of the Forest Code of the Russian Federation»		https://www.garant.ru/products/ipo/prime/doc/71480564/
5.3	80	Federal Law No. 7-FZ of 10 January 2002 (revision of 27.12.2019) "On Environment Conservation"	Федеральный закон от 10.01.2002 N 7-ФЗ (ред. от 27.12.2019) "Об охране окружающей среды"	https://legalacts.ru/doc/FZ-obohrane-okruzhajuwej-sredy/
5.4	81	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)		http://www.leskodeks.ru/
5.4	82	Federal Law No. 7-FZ of 10 January 2002 (revision of 27.12.2019) "On Environment Conservation"		https://legalacts.ru/doc/FZ-obohrane-okruzhajuwej-sredy/
5.4	83	Code of administrative offences of the Russian Federation of 30.12.2001 No.195-FZ (revision of 18.03.2020)		http://www.consultant.ru/document/cons_doc_LAW_34661/
5.4	84	Peatlands - guidance for climate change mitigation through conservation, rehabilitation and sustainable use, Second edition. Mitigation of Climate Change in Agriculture Series 5. Food and Agriculture Organization of the United Nations and Wetlands		http://www.fao.org/3/a-an762e.pdf

		International Mitigation of Climate Change in Agriculture (MICCA) Programme, October 2012		
6.1	85	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (edited 27.12.2018)	Лесной кодекс Российской Федерации от 04.12.2006 N 200-ФЗ (ред. от 27.12.2018)	http://www.leskodeks.ru/
6.1	86	Order of the Ministry of Natural Resources of 13.09.2016 No.474 (edited 11.01.2017) «On approval of the rules for timber harvesting and the features of timber harvesting in forest districts, forest parks, specified in Article 23 of the Forest Code of the Russian Federation»	Приказ Министерства природных ресурсов и экологии РФ от 13 сентября 2016 г. № 474 "Об утверждении Правил заготовки древесины и особенностей заготовки древесины в лесничествах, лесопарках, указанных в статье 23 Лесного кодекса Российской Федерации"	https://www.garant.ru/products/ipo/prime/doc/71480564/
6.1	87		Приказ Министерства природных ресурсов и экологии Российской Федерации от 25 марта 2019 года N 188 об утверждении Правил лесовосстановления, состава проекта лесовосстановления, порядка разработки проекта лесовосстановления и внесения в него изменений (с изменениями на 14 августа 2019 года)	http://docs.cntd.ru/document/554151577/
6.1	88		Доработанный текст проекта Постановления Правительства Российской Федерации "Об утверждении мер по сохранению лесных насаждений, лесных почв, среды обитания объектов животного мира, других природных объектов в лесах" (подготовлен Минприроды России 24.08.2018)	https://www.garant.ru/products/ipo/prime/doc/56669938/
6.1	89	Code of Administrative Offences of the Russian Federation of 30.12.2001 No.195-FZ (redaction of 18.03.2020)		http://www.consultant.ru/document/cons_doc_LAW_34661/
6.1	90	Land Code of the Russian Federation" dated 10.25.2001 N 136-ФЗ (as amended on 03/18/2020)		http://www.consultant.ru/document/cons_doc_LAW_33773/
6.2	91	Order of the Ministry of Natural Resources of 13.09.2016 No.474 (revision of 11.01.2017) «On approval of the rules for timber harvesting and the features of timber harvesting in forest districts, forest parks, specified in Article 23 of the Forest Code of the Russian Federation»		https://www.garant.ru/products/ipo/prime/doc/71480564/
6.2	92	Приказ Министерства природных ресурсов и экологии Российской Федерации от 25 марта 2019 года N 188 об утверждении Правил лесовосстановления, состава проекта лесовосстановления, порядка разработки проекта лесовосстановления и внесения в него изменений (с изменениями на 14 августа 2019 года)		http://docs.cntd.ru/document/554151577/
6.2	93	Доработанный текст проекта Постановления Правительства Российской Федерации "Об утверждении мер по сохранению лесных насаждений, лесных почв, среды обитания объектов животного мира, других природных объектов в лесах" (подготовлен Минприроды России 24.08.2018)		https://www.garant.ru/products/ipo/prime/doc/56669938/
6.3	94	Federal Law No. 7-FZ of 10 January 2002 (revision of 27.12.2019) "On Environment Conservation"		https://legalacts.ru/doc/FZ-obohrane-okruzhajujej-sredy/
6.4	95	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)		http://www.leskodeks.ru/
6.4	96	Code of administrative offences of the Russian Federation of 30.12.2001 No.195-FZ (revision of 18.03.2020)		http://www.consultant.ru/document/cons_doc_LAW_34661/
7.1	97	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (edited 27.12.2018)	Лесной кодекс Российской Федерации от 04.12.2006 N 200-ФЗ (ред. от 27.12.2018)	http://www.leskodeks.ru/
7.1	98	Federal Law No 33-FZ of 14.03.1995 (revision of 26.07.2019) "On specially protected nature areas"	Федеральный закон от 14 марта 1995 г. N 33-ФЗ "Об особо охраняемых природных территориях" (с изменениями на 26 июля 2019 года)	http://base.garant.ru/10107990/
7.1	99		Федеральный закон от 14 марта 1995 г. N 33-ФЗ "Об особо охраняемых природных территориях"	https://legalacts.ru/doc/FZ-obohrane-okruzhajujej-sredy/
7.1	100	Federal Law No. 7-FZ of 10 January 2002 (edited 27.12.2019) "On Environment Conservation"	Федеральный закон от 10.01.2002 N 7-ФЗ (ред. от 27.12.2019) "Об охране окружающей среды"	http://base.garant.ru/10107990/#ixzz6loY9j0VY
7.1	101		Федеральный закон "Об экологической экспертизе" от 23.11.1995 N 174-ФЗ (с изменениями на 27 декабря 2019 года)	http://docs.cntd.ru/document/9014668
7.1	102		Национальная стратегия сохранения биоразнообразия России, 2012	http://www.caresd.net/img/docs/530.pdf
7.1	103		Стратегия сохранения редких и находящихся под угрозой исчезновения видов животных и растений в РФ до 2030 г. (2014)	https://mosmetod.ru/metodicheskie-prostranstvo/srednyaya-istarshaya-shkola/biologiya/normativnye-

				dokumenty/strategiya-sokhraniya-redkikh-i-nakhodyashchikhsya-pod-ugrozoj-ischeznoveniya-vidov-zhivotnykh-i-rastenij-i-ra.html
7.1	104	Order of the Ministry of Natural Resources No.181 of 16.07.2007 "On approval of special terms for usage, tending, protection, reforestation for forests located in nature reserves"	Приказ МПР РФ от 16 июля 2007 г. № 181 "Об утверждении Особенности использования, охраны, защиты, воспроизводства лесов, расположенных на особо охраняемых природных территориях"	https://www.garant.ru/products/ipo/prime/doc/12055425/
7.1	105	Order of the Ministry of Natural Resources of 13.09.2016 No.474 (edited 11.01.2017) «On approval of the rules for timber harvesting and the features of timber harvesting in forest districts, forest parks, specified in Article 23 of the Forest Code of the Russian Federation»	Приказ Министерства природных ресурсов и экологии РФ от 13 сентября 2016 г. № 474 "Об утверждении Правил заготовки древесины и особенностей заготовки древесины в лесничествах, лесопарках, указанных в статье 23 Лесного кодекса Российской Федерации"	https://www.garant.ru/products/ipo/prime/doc/71480564/
7.1	106	Order of the Ministry of Natural Resources No. 692 of 20.12.2017 "On approval of sample form and content of forest management plans of subjects of the Russian Federation and its development and amending procedures"	Приказ Минприроды России от 20.12.2017 N 692 "Об утверждении типовой формы и состава лесного плана субъекта Российской Федерации, порядка его подготовки и внесения в него изменений"	http://www.consultant.ru/document/cons_doc_LAW_295497/
7.1	107	Order of Ministry of Natural Resources of 27.02.2017 No.72 "on approving the content of forest district plans, procedure for their development, duration time and amending procedure"	Приказ Минприроды России от 27.02.2017 N 72 "Об утверждении состава лесохозяйственных регламентов, порядка их разработки, сроков их действия и порядка внесения в них изменений"	https://rulaws.ru/acts/Prikaz-Minprirody-Rossii-ot-27.02.2017-N-72/
7.1	108	Code of Administrative Offences of the Russian Federation of 30.12.2001 No.195-FZ (edited 18.03.2020)	Кодекс Российской Федерации об административных правонарушениях от 30.12.2001 N 195-ФЗ (ред. от 18.03.2020)	http://www.consultant.ru/document/cons_doc_LAW_34661/
7.2	109	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)		http://www.leskodeks.ru/
7.2	110	Publicly available, detailed information about several kinds of High Conservation Value Forests (HCVF) in Russia is collected on a website of World Wide Fund for Nature (WWF).		http://hcvf.ru
7.3	111	Order of the Ministry of Natural Resources and Ecology of the Russian Federation dated April 12, 2016 N 233 "On Approving the Administrative Regulation for the Execution of the State Function for the Implementation of the Federal State Forestry Supervision (Forest Protection)"		http://www.consultant.ru/document/cons_doc_LAW_204106/
7.4	112	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)		http://www.leskodeks.ru/
7.4	113	Code of Administrative Offences of the Russian Federation of 30.12.2001 No.195-FZ (revision of 18.03.2020)		http://www.consultant.ru/document/cons_doc_LAW_34661/
8.1	114	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (edited 27.12.2018)	Лесной кодекс Российской Федерации от 04.12.2006 N 200-ФЗ (ред. от 27.12.2018)	http://www.leskodeks.ru/
8.1	115	Order of Federal Forestry Agency No.105 of 09.04.2015 "On verification of felling age"	Приказ Рослесхоза от 09.04.2015 N 105 (ред. От 02.07.2015) "Об установлении возрастов рубок"	https://rulaws.ru/acts/Prikaz-Rosleshoza-ot-09.04.2015-N-105/
8.1	116	Order of the Federal Forestry Agency (Rosleskhoz) of May 27, 2011 N 191 "On approval of the procedure for calculating the estimated cutting area"	Приказ Федерального агентства лесного хозяйства (Рослесхоз) от 27 мая 2011 г. N 191 "Об утверждении Порядка исчисления расчетной лесосеки"	https://rg.ru/2011/07/07/lesoseka-site-dok.html
8.1	117	Приказ Минприроды России от 21.08.2017 N 451 "Об утверждении перечня информации, включаемой в отчет об использовании лесов, формы и порядка представления отчета об использовании лесов, а также требований к формату отчета об использовании лесов в электронной форме"		http://www.consultant.ru/document/cons_doc_LAW_286062/
8.1	118	Code of Administrative Offences of the Russian Federation of 30.12.2001 No.195-FZ (edited 18.03.2020)	Кодекс Российской Федерации об административных правонарушениях от 30.12.2001 N 195-ФЗ (ред. от 18.03.2020)	http://www.consultant.ru/document/cons_doc_LAW_34661/
8.1	119	Decree of the Government of the Russian Federation of April 15, 2014 N 318 On approval of the state program of the Russian Federation Development of forestry "	Постановление Правительства РФ от 15 апреля 2014 г. N 318 Об утверждении государственной программы Российской Федерации Развитие лесного хозяйства"	http://www.consultant.ru/document/cons_doc_LAW_162196/
8.2	120	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)		http://www.leskodeks.ru/
8.2	121	Order of Ministry of Natural Resources of 27.02.2017 No.72 "on approving the content of forest district plans, procedure for their development, duration time and amending procedure"		https://rulaws.ru/acts/Prikaz-Minprirody-Rossii-ot-27.02.2017-N-72/

8.2	122	Order of the Federal Forestry Agency No. 69 of 29 February 2012. "Content of a forest development project and a procedure for its development"		http://www.consultant.ru/document/cons_doc_LAW_129583/
8.2	123	Order of the Ministry of Natural Resources No. 17 of 16 January 2015 "On approving a sample form for a forest declaration, procedures for its development and submission, requirements for electronic version of forest declaration"		http://www.consultant.ru/document/cons_doc_LAW_175910/
8.4	124	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)		http://www.leskodeks.ru/
8.4	125	Code of administrative offences of the Russian Federation of 30.12.2001 No.195-FZ (revision of 18.03.2020)		http://www.consultant.ru/document/cons_doc_LAW_34661/
8.4	126	Decree of the Government of the Russian Federation of June 22, 2007 No. 394 "On approval of the Regulation on the implementation of federal state forest supervision (forest protection)" (redaction of 02.03.2019)		http://base.garant.ru/12154199/
9	127			https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27
9	128	On Russia's participation in the Paris climate agreement, Russian Government, September 23, 2019	Об участии России в Парижском соглашении по климату, Правительство России, 23 сентября 2019	http://government.ru/docs/37917/
9	129	Vienna Convention on the Law of Treaties 1969		https://treaties.un.org/Pages/Overview.aspx?path=overview/glossary/page1_en.xml
10a1	130			https://www4.unfccc.int/sites/NDCCStaging/Pages/All.aspx
10b1	131	Draft Federal Law "On state regulation of greenhouse gas emissions and removals and on amendments to certain legislative acts of the Russian Federation" (prepared by the Ministry of Economic Development of Russia) (not included in the State Duma of the Federal Assembly of the Russian Federation, text as of 03/27/2019)	Проект Федерального закона "О государственном регулировании выбросов и поглощений парниковых газов и о внесении изменений в отдельные законодательные акты Российской Федерации" (подготовлен Минэкономразвития России) (не внесен в ГД ФС РФ, текст по состоянию на 27.03.2019)	http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=PRJ&n=183113#0553636326202084
10b1	132	Draft order of the Government of the Russian Federation on approval of the Strategy for the long-term development of the Russian Federation with a low level of greenhouse gas emissions until 2050		https://economy.gov.ru/material/file/babacbb75d32d90e28d3298582d13a75/proekt_strategii.pdf
10b1	133			https://economy.gov.ru/material/news/minekonomrazvitiya_rossii_podgotovilo_proekt_strategii_dolgosrochnogo_razvitiya_rossii_s_nizkim_urovнем_vybrosov_parnikovyh_gazov_do_2050_goda_.html
10b1	134	Forest Code of the Russian Federation No. 200-FZ of 4 December 2006 (revision of 27.12.2018)		http://www.leskodeks.ru/
10b1	135	Convention on Wetlands of International Importance, mainly as habitats for waterfowl		https://unesdoc.unesco.org/ark:/48223/pf0000261400_rus
10b1	136	Order of the Federal Forestry Agency (Rosleskhoz) of May 27, 2011 N 191 "On approval of the procedure for calculating the estimated cutting area"		https://rg.ru/2011/07/07/lesoseka-site-dok.html
10b2	137	Summary of GHG Emissions for Russian Federation 2012		https://unfccc.int/files/ghg_emissions_data/application/pdf/rus_ghg_profile.pdf

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=RUS>

² [http://www.fao.org/faostat/en/wood_fuel_production_and_export_\(2018\)](http://www.fao.org/faostat/en/wood_fuel_production_and_export_(2018))

³ An overview of the extensive list of references is included in the appendix to this document.



USA Background information

Land area	914,74 million hectares ¹
Forest area	310,10 million hectares, 34% ¹
National Forests (NFS)	76,216,948 hectares ²
Wood fuel production	70,548,631 m ³ ³
Wood fuel export	318,000 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	USA- Georgia	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Georgia Forestry Commission (2017)⁴ US Forest Service Planning Rule of 2012⁵ National Forest Management Act of 1976⁶ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{4,5,6}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{4,7}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{4,8}	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> US National Forest Reforestation requirements summary⁹ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁹	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{9,10}	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁹	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> National Park Service Organic Act of 1916¹¹ Endangered Species Act of 1973¹² National Wildlife Refuges:¹³ Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119) Migratory Bird Conservation Act (16 U.S.C. 715 et seq.; 45 Stat. 1222) Fish and Wildlife Coordination Act (16 U.S.C. 661-666c; 48 Stat. 401) Lea Act (16 USC 695-695c; 62 Stat. 238) Emergency Wetlands Resources Act (16 U.S.C. 3901; 100 Stat 3582) Endangered Species Act (16 U.S.C. 1531-1543; 87 Stat. 884). 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{11,14}	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{15,16}	

5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{17,18}	
6	Maintenance of soil quality to minimize negative impact	Yes	
6.1	Law name and date?	(see below)	
	1. US Federal Clean Water Act ¹⁹ 2. State of Georgia Water Quality Protection ²⁰		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{21,22,23,24}	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{21,25}	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ²¹	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	1. US Federal Endangered Species Act ²⁶ 2. State of Georgia Endangered Wildlife Act ²⁷		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{28,29}	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{24,30}	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ³¹	
8	Maintenance and improvement of long-term production capacity	No	Even though a number of Federal laws are available covering this criterion, there is no legislation in place to ensure a certain productivity goal is met on private land. A forest owner on private land is exempt of meeting the Federal laws highlighted in the references. This includes clearcutting and not replanting. As a result, this criterion is deemed not met.
8.1	Law name and date?	No ^{22,32}	
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ³³	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{34, 35,36,37,38,39,40}	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁴¹	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ⁴²	The US intends to leave the agreement in November 2020, which would cause this to turn to No.
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ⁴³	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ⁴³	

¹ <http://www.fao.org/countryprofiles/index/en/?iso3=USA>, 2016 values

² <http://www.fs.fed.us/land/staff/lar/LAR2015/FY2015%20LAR%20Book.pdf>

³ [http://www.fao.org/faostat/en/wood_fuel_production_and_export_\(2018\)](http://www.fao.org/faostat/en/wood_fuel_production_and_export_(2018))

⁴ <https://gatrees.org/wp-content/uploads/2019/11/Forestry-Laws-2017.pdf>

⁵ https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5362536.pdf

⁶ <https://www.fs.fed.us/emc/nfma/includes/NFMA1976.pdf>

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- ⁷ National Forest Monitoring and Evaluation: <https://www.fs.fed.us/emc/met/>
- ⁸ US Forest Service Monitoring and Evaluation Framework: <https://www.fs.fed.us/emc/met/>
- ⁹ <https://www.fs.fed.us/restoration/reforestation/overview.shtml>
- ¹⁰ National Forest reporting to US Congress: <https://www.fs.usda.gov/visit/passes-permits/reports>
- ¹¹ <https://www.law.cornell.edu/uscode/text/54/100101>
- ¹² http://www.law.cornell.edu/uscode/html/uscode16/usc_sup_01_16_10_35.html
- ¹³ <https://www.fws.gov/laws/lawsdigest/nwracts.html>
- ¹⁴ <https://www.fws.gov/le/index.html>
- ¹⁵ National Park Service Incident Reporting System: <https://www.doi.gov/privacy/case-incident-reporting-system-national-park-service-nps-19>
- ¹⁶ US Fish and Wildlife Service Annual Monitoring Reports (National): <https://www.fws.gov/le/annual-reports.html>
- ¹⁷ National Park Service: <https://www.nps.gov/policy/DOrders/DOrder9.html>
- ¹⁸ US Fish and Wildlife Service (national): <https://www.fws.gov/le/index.html>
- ¹⁹ https://cfpub.epa.gov/watertrain/moduleFrame.cfm?parent_object_id=1522&object_id=1528
- ²⁰ <https://gatrees.org/forest-management-conservation/water-quality-protection/>
- ²¹ Georgia Forestry Commission Water Quality BMP Monitoring: <http://gatrees.net/forest-management/water-quality/>
- ²² Georgia Water Control quality Act.
[https://openei.org/wiki/Georgia_Water_Quality_Control_Act_\(Georgia\)#:~:text=The%20Georgia%20Water%20Quality%20Control,Environmental%20Protection%20Division%20\(EPD\).](https://openei.org/wiki/Georgia_Water_Quality_Control_Act_(Georgia)#:~:text=The%20Georgia%20Water%20Quality%20Control,Environmental%20Protection%20Division%20(EPD).)
- ²³ PUBLIC LAW 89-560-SEPT. 7, 1966. <https://uscode.house.gov/statutes/pl/89/560.pdf>
- ²⁴ The Soil Conservation Act of April 27, 1936. <http://nationalaglawcenter.org/wp-content/uploads/assets/farmbills/soilconserv1936.pdf>
- ²⁵ https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054261
- ²⁶ <https://www.fws.gov/laws/lawsdigest/esact.html>
- ²⁷ <http://rules.sos.ga.gov/GAC/391-4-10?urlRedirected=yes&data=admin&lookingfor=391-4-10>
- ²⁸ US Fish and Wildlife Service as implementation and enforcement: https://www.fws.gov/engangered/improving_esa/index.html
- ²⁹ USGS Protected Area Database (PAD): https://www.usgs.gov/core-science-systems/science-analytics-and-synthesis/gap/science/pad-us-data-overview?qt-science_center_objects=0#qt-science_center_objects
- ³⁰ <https://www.fws.gov/engangered/what-we-do/recovery-overview.html>
- ³¹ <https://gadnrle.org/division>
- ³² <https://www.fordlibrarymuseum.gov/library/document/0055/12000335.pdf>
- ³³ <https://www.epa.gov/sites/production/files/2017-08/documents/federal-water-pollution-control-act-508full.pdf>
- ³⁴ Wetland Protection Act (Chapter 391-3-16-.03)
- ³⁵ River Corridor Protection Act (Chapter 391-3-16-.04)
- ³⁶ Mountain Protection Act (Chapter 391-3-16-.05)
- ³⁷ Coastal Management Act (O.C.G.A. 12-5-260)
- ³⁸ Erosion and Sediment Control Act (O.C.G.A. 12-7-1)
- ³⁹ State Board of Registration for Foresters Standards of Practice (O.C.G.A. 43-1-19) Chapter 220-5.01
- ⁴⁰ <https://www.fs.usda.gov/treesearch/pubs/57903>
- ⁴¹ Georgia's Best Management Practices for Forestry. <https://gatrees.org/wp-content/uploads/2020/02/BMP-Manual-2019-Web.pdf>
- ⁴² <https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=USA>
- ⁴³ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/United%20States%20of%20America%20First/U.S.A.%20First%20NDC%20Submission.pdf>



USA Background information

Land area	914,74 million hectares ¹
Forest area	310,10 million hectares, 34% ¹
National Forests (NFS)	76,216,948 hectares ²
Wood fuel production	70,548,631 m ³ ³
Wood fuel export	318,000 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	USA- North Carolina	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	Yes	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> Right to practice forestry of 2005⁴ US Forest Service Planning Rule of 2012⁵ National Forest Management Act of 1976⁶ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{5,6}	
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,7}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁷	
4	Forest regeneration of harvested area	Yes	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> US National Forest Reforestation requirements summary⁸ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ⁸	
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{8,9}	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ⁸	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	Yes	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> National Park Service Organic Act of 1916¹⁰ Endangered Species Act of 1973¹¹ National Wildlife Refuges:¹² Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119) Migratory Bird Conservation Act (16 U.S.C. 715 et seq.; 45 Stat. 1222) Fish and Wildlife Coordination Act (16 U.S.C. 661-666c; 48 Stat. 401) Lea Act (16 USC 695-695c; 62 Stat. 238) Emergency Wetlands Resources Act (16 U.S.C. 3901; 100 Stat 3582) Endangered Species Act (16 U.S.C. 1531-1543; 87 Stat. 884). 		
5.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{10,13}	
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{14,15}	

5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{16, 17}	
6	Maintenance of soil quality to minimize negative impact	No	
6.1	Law name and date?	(see below)	North Carolina is dominated by private forests. There is no legal requirement for private forests to follow water guideline as set on federal level. The best management practices (BMPs) are voluntary in the state and are monitored.
	<ol style="list-style-type: none"> 1. US Federal Clean Water Act^{18,19} 2. Drinking Water Protection Program²⁰ 3. 15A NCAC 18C .1305 Source Water Protection Planning²¹ 		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ^{22,23,24,25,26}	
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{26,27,28}	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{22,26,29}	
7	Maintenance of biodiversity to minimize negative impact	Yes	
7.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. US Federal Endangered Species Act³⁰ 		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ²³	
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ²³	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{31,32}	
8	Maintenance and improvement of long-term production capacity	No	
8.1	Law name and date?	No ^{33,34,35}	Even though a number of Federal laws are available covering this criterion, there is no legislation in place to ensure a certain productivity goal is met on private land. A forest owner on private land is exempt of meeting the Federal laws highlighted in the references. This includes clearcutting and not replanting. As a result, this criterion is deemed not met.
8.2	Is there an enforcement system outlined in place related to the law(s) above?	Yes ³⁶	
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{28,37}	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{22,29}	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ³⁸	The US intends to leave the agreement in November 2020, which would cause this to turn to No.
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ³⁹	
10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ⁴⁰	

- ¹ <http://www.fao.org/countryprofiles/index/en/?iso3=USA>, 2016 values
- ² <http://www.fs.fed.us/land/staff/lar/LAR2015/FY2015%20LAR%20Book.pdf>
- ³ http://www.fao.org/faostat/en/wood_fuel_production_and_export (2018)
- ⁴ <https://www.ncleg.net/Sessions/2005/Bills/Senate/PDF/S681v6.pdf>
- ⁵ https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5362536.pdf
- ⁶ <https://www.fs.fed.us/emc/nfma/includes/NFMA1976.pdf>
- ⁷ National Forest Monitoring and Evaluation: <https://www.fs.fed.us/emc/met/>
- ⁸ <https://www.fs.fed.us/restoration/reforestation/overview.shtml>
- ⁹ National Forest reporting to US Congress: <https://www.fs.usda.gov/visit/passes-permits/reports>
- ¹⁰ <https://www.law.cornell.edu/uscode/text/54/100101>
- ¹¹ http://www.law.cornell.edu/uscode/html/uscode16/usc_sup_01_16_10_35.html
- ¹² <https://www.fws.gov/laws/lawsdigest/nwracts.html>
- ¹³ US Fish and Wildlife Service (national): <https://www.fws.gov/le/index.html>
- ¹⁴ National Park Service Incident Reporting System: <https://www.doi.gov/privacy/case-incident-reporting-system-national-park-service-nps-19>
- ¹⁵ US Fish and Wildlife Service Annual Monitoring Reports (National): <https://www.fws.gov/le/annual-reports.html>
- ¹⁶ <https://www.nps.gov/policy/DOrders/DOrder9.html>
- ¹⁷ <https://www.fws.gov/le/index.html>
- ¹⁸ https://cfpub.epa.gov/watertrain/moduleFrame.cfm?parent_object_id=1522&object_id=1528
- ¹⁹ <https://www.ncforestservice.gov/publications/WQ0107/xAppx%201-%20Regulations%20and%20laws.pdf>
- ²⁰ <https://deq.nc.gov/about/divisions/water-resources/drinking-water/drinking-water-protection-program>
- ²¹ <http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2018%20-%20environmental%20health/subchapter%20c/15a%20ncac%2018c%20.1305.pdf>
- ²² North Carolina Forest Service Regulations and Laws: <https://www.ncforestservice.gov/publications/WQ0107/xAppx%201-%20Regulations%20and%20laws.pdf>;
- ²³ North Carolina Forest Service Best Management Practices Manual (BMP) to implement regulation: https://www.ncforestservice.gov/publications/WQ0107/BMP_manual.pdf
- ²⁴ PUBLIC LAW 89-560-SEPT. 7, 1966. <https://uscode.house.gov/statutes/pl/89/560.pdf>
- ²⁵ The Soil Conservation Act of April 27, 1936. <http://nationalaglawcenter.org/wp-content/uploads/assets/farmbills/soilconserv1936.pdf>
- ²⁶ North Carolina Forestry BMP Manual Appendix 1: (updated July 2018) Citation of Laws, Regulations, and other Requirements: <https://www.ncforestservice.gov/publications/WQ0107/xAppx%201-%20Regulations%20and%20laws.pdf>
- ²⁷ https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054261
- ²⁸ https://www.ncforestservice.gov/water_quality/bmp_manual.htm
- ²⁹ North Carolina Forest Service. https://www.ncforestservice.gov/water_quality/bmp_manual.htm
- ³⁰ <https://www.fws.gov/laws/lawsdigest/esact.html>
- ³¹ US Fish and Wildlife Service as enforcement agency: https://www.fws.gov/raleigh/es_tes.html; See same website for listed species by county
- ³² USGS Protected Area Database (PAD): <https://www.usgs.gov/core-science-systems/science-analytics-and-synthesis/gap/sc>
- ³³ <https://www.epa.gov/sites/production/files/2017-08/documents/federal-water-pollution-control-act-508full.pdf>
- ³⁴ Federal Water Pollution Control Act. <https://www.fws.gov/laws/lawsdigest/FWATRPO.HTML>
- ³⁵ <https://www.fordlibrarymuseum.gov/library/document/0055/12000335.pdf>
- ³⁶ <https://www.epa.gov/cwa-404/clean-water-laws-regulations-and-executive-orders-related-section-404>
- ³⁷ <https://www.fs.usda.gov/treesearch/pubs/57903>
- ³⁸ <https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=USA>
- ³⁹ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/United%20States%20of%20America%20First/U.S.A.%20First%20NDC%20Submission.pdf>



Background information

Land area	57.93 million hectares ¹
Forest area	9.66 million hectares, 16.7% ¹
Protected forests and forests under Natura 2000	20.000 hectares (estimated) ²
Wood fuel production	10,719,000 m ³ ³
Wood fuel export	1,043,000 m ³ ³

Sustainable Harvesting Criteria

#	Criteria	Is the criteria embedded? How?	Comments
1	Country-region name:	Ukraine	
2	Is forestry policy/legislation of national or regional competence?	National competence	
3	Legality and harvesting operation	No	
3.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forest code of Ukraine (No.3852-XII of 1994), section 4, Articles 12-13, current edition - Revision as of - 1/16/2020⁴ 2. Ministerial Decree No. 0085 -10, 2009 "On the validation of the Regulation on main use felling".⁵ 3. Ministerial Decree No. 761 of 2007 «On the settlement of issues related to the special use of forest resources»⁶ 4. Ministerial Decree No. 724 of 2007 «On approval of the Rules for improving the quality of forests»⁷ 		
3.2	Is there an enforcement system outlined in place related to the law(s) above?	No ^{8,9}	The briefing notes from UNEP-WCMC report several issues with enforcement of legality, therefore enforcement was set to No. ¹⁰
3.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{11,12,13}	
3.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ¹⁴	
4	Forest regeneration of harvested area	No	
4.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forest code of Ukraine (No.3852-XII of 1994), section 5, Articles 14, current edition - Revision as of 1/16/2020¹⁵ 2. Ministerial Decree No. 303-2007 "On the approval of the Rules of Forest Regeneration"¹⁶ 		
4.2	Is there an enforcement system outlined in place related to the law(s) above?	No ⁹	The briefing notes from UNEP-WCMC report several issues with enforcement of forestry laws in Ukraine, therefore enforcement was set to No. ¹⁰
4.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{11,12,13,17}	
4.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{12,13}	
5	Legislation is in place to ensure that areas designated by international or national law or by the relevant competent authority for nature protection purposes, including wetlands and peatlands, are protected	No	
5.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Law of Ukraine No. 2456-XII of 1992 "On Natural Reserves".¹⁸ 2. Law of Ukraine No. 962-IV of 2003 "On land protection".¹⁹ 3. Ministerial Decree No. 733-2007 "On approval of the Order of division of forests into categories and selection of especially protective forest areas"²⁰ 4. Ministerial Decree No. 1287-2002 "On the Procedure for Granting Wetlands with the Status of Wetlands of International Importance"²¹ 		

5.2	Is there an enforcement system outlined in place related to the law(s) above?	No ^{9,10}	The briefing notes from UNEP-WCMC report several issues with enforcement of forestry laws in Ukraine, therefore enforcement was set to No. ¹⁰
5.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{11,12,13}	
5.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{12,13}	
6	Maintenance of soil quality to minimize negative impact	No	
6.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forest Code of Ukraine No.3852-XII of 1994, article 14, sec.2, § 2; article 19, sec.2, § 1; article 83, sec.1, § 2.⁴ 2. Law of Ukraine No.962-IV of 2003 "On land protection" , article 41.¹⁹ 3. Order No. 364 of 2009 of the State Committee of Forest Resources validating the Regulation on main use felling in forests, section 5. ²² 		
6.2	Is there an enforcement system outlined in place related to the law(s) above?	No ^{9,23}	The briefing notes from UNEP-WCMC report several issues with enforcement of forestry laws in Ukraine, therefore enforcement was set to No. ¹⁰
6.3	Is there a monitoring system in place related to the law(s) above?	Yes ^{5,24}	
6.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ^{25,26}	
7	Maintenance of biodiversity to minimize negative impact	No	
7.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forest Code of Ukraine No.3852-XII of 1994, article 85⁵ 2. Law of Ukraine On Amendments to Some Legislative Acts of Ukraine on protection of biodiversity No. 323-VIII of 2015²⁷ 3. Concept of the National Program for Conservation of Biodiversity for 2005-2025 No. 675-p of 2004; 4. Order No. 364 of 2009 of the State Committee of Forest Resources validating the Regulation on main use felling in forests, §1.3^{28,29} 		
7.2	Is there an enforcement system outlined in place related to the law(s) above?	No ^{9, 10}	The briefing notes from UNEP-WCMC report several issues with enforcement of forestry laws in Ukraine, therefore enforcement was set to No. ¹⁰
7.3	Is there a monitoring system in place related to the law(s) above?	Yes ²⁶	
7.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ³⁰	
8	Maintenance and improvement of long-term production capacity	No	
8.1	Law name and date?	(see below)	
	<ol style="list-style-type: none"> 1. Forest Code of Ukraine No.3852-XII of 1994, article 43-44.⁵ 2. Instruction for the procedure of approval of prescribed annual cut No. 38 of 2007.³¹ 		
8.2	Is there an enforcement system outlined in place related to the law(s) above?	No ^{9,23}	The briefing notes from UNEP-WCMC report several issues with enforcement of forestry laws in Ukraine, therefore enforcement was set to No. ¹⁰
8.3	Is there a monitoring system in place related to the law(s) above?	Yes ³¹	
8.4	Is there a competent authority in place responsible for the monitoring and the application of sanctions?	Yes ³²	

LULUCF Criteria

#	Criteria	National level	Comments
9	Is the country of origin of the biomass a signatory of the Paris Agreement?	Yes ³³	
10.a.i	Has the country submitted a Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ³⁴	

10.a.ii	Is the LULUCF sector included in the Nationally Determined Contribution (NDC) to the UNFCCC?	Yes ^{34,35}	
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¹ <http://www.fao.org/countryprofiles/index/en/?iso3=UKR>, 2016 values

² Estimated value from <http://www.wfmmi.org/boat/?uNewsID=358973>

³ <http://www.fao.org/faostat/en/> wood fuel production and export (2018)

⁴ Forest code of Ukraine: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC043452>

⁵ Decree "On the validation of the Regulation on main use felling": <https://zakon.rada.gov.ua/laws/show/z0085-10>

⁶ Decree «On the settlement of issues related to the special use of forest resources»: <https://zakon.rada.gov.ua/laws/show/761-2007-%D0%BF>

⁷ Decree «On approval of the Rules for improving the quality of forests»: <https://zakon.rada.gov.ua/laws/show/724-2007-%D0%BF>

⁸ Code of Ukraine on Administrative Offences: <https://zakon.rada.gov.ua/laws/show/80731-10>

⁹ Criminal Code of Ukraine: <https://zakon.rada.gov.ua/laws/show/2341-14>

¹⁰ BUNEP-WCMC Briefing Note for the Competent Authorities (CA) implementing the EU Timber Regulation

May - June 2019: https://ec.europa.eu/environment/forests/pdf/Briefing%20note%20May-June%202019_Final.pdf

¹¹ Law of Ukraine #877-16 "On the basic principles of state supervision (control) in the field of economic activity": <https://zakon.rada.gov.ua/laws/show/877-16>

¹² Provisions of the State Forest Resources Agency of Ukraine: <https://zakon.rada.gov.ua/laws/show/521-2014-%D0%BF>

¹³ Provisions of the State Environmental Inspection of Ukraine: <https://zakon.rada.gov.ua/laws/show/275-2017-%D0%BF#n8>

¹⁴ https://ec.europa.eu/environment/forests/pdf/Country_overview_Ukraine__03_10_2018.pdf

¹⁵ Forest Code of Ukraine: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC043452>

¹⁶ Ministerial Decree No. 303-2007 "On the approval of the Rules of Forest Regeneration": <https://zakon.rada.gov.ua/laws/show/303-2007-%D0%BF>

¹⁷ Report of SFRE on Reforestation and afforestation: http://dklg.kmu.gov.ua/forest/control/uk/publish/article?art_id=121176&cat_id=32875

¹⁸ Law of Ukraine No. 2456-XII "On Natural Reserves": <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC045103>

¹⁹ Law of Ukraine No. 962-IV "On land protection": <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC137032>

²⁰ Ministerial Decree No. 733-2007: <https://zakon.rada.gov.ua/laws/show/733-2007-%D0%BF>

²¹ Ministerial Decree No. 1287-2002: <https://zakon.rada.gov.ua/laws/show/1287-2002-%D0%BF>

²² Regulation on main use felling in forests, <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC171975>

²³ State Statistics Service of Ukraine: <http://www.ukrstat.gov.ua/>

²⁴ Regulation on the state system of environmental monitoring No. 391 of 1998: <https://zakon.rada.gov.ua/laws/show/391-98-%D0%BF>

²⁵ http://dklg.kmu.gov.ua/forest/control/uk/publish/article?art_id=62971&cat_id=32880.

²⁶ https://www.dei.gov.ua/posts?category_id=17&post_type_id=1

²⁷ Law of Ukraine On Amendments to Some Legislative Acts of Ukraine on protection of biodiversity:

<https://zakon.rada.gov.ua/laws/show/323-19>

²⁸ Regulation on main use felling in forests: <https://zakon.rada.gov.ua/laws/show/675-2004-%D1%80>

²⁹ Regulation on main use felling in forests: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC171975>

³⁰ http://dklg.kmu.gov.ua/forest/control/uk/publish/article?art_id=100429&cat_id=36090

³¹ Instruction for the procedure of approval of prescribed annual cut No. 38 of 2007: <https://zakon.rada.gov.ua/laws/show/z0160-07>.

³² http://dklg.kmu.gov.ua/forest/control/uk/publish/category?cat_id=32881

³³ <https://zakon.rada.gov.ua/laws/show/1469-19>

³⁴ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Ukraine%20First/Ukraine%20First%20NDC.pdf>

³⁵ <https://climateactiontracker.org/countries/ukraine/pledges-and-targets>

Appendix C. CASE STUDIES FOREST BIOMASS

C.1. Selection of forest biomass case studies

The selection of forest biomass case studies was based on the following elements:

- Case studies on both the sustainable harvesting criteria as well as the LULUCF criteria.
- Countries not complying with Level A for either the sustainable harvesting or LULUCF criteria.
- Geographical spread (e.g. coverage of different countries) as to have examples for some EU and some non-EU countries.
- Countries where production of forest biomass for energy purposes takes place not using processing residues (e.g. pellets produced from saw dust do not have to demonstrate compliance with forest sustainability criteria).

The basis of case studies was the stepwise approach as developed for level B. It was checked if all necessary information is available and adequate for the compliance analysis for those elements not complied with in the level A analysis (country sheets).

For each case study, a report centred on the following elements was produced:

- Description of the case analysed, including reference to its geographical location, review of sustainable production or LULUCF criteria (or which specific elements within these criteria), chain of custody and any other relevant specifics.
- For each sub-criterion, a check was done to determine whether evidence was available to demonstrate compliance, with specific reference to the evidence available to demonstrate this and the enforcement/monitoring system available for this evidence.
- A brief section with main findings or recommendations feeding back to the overall guidance/checklist for level B evidence. In this section we also provided some reflections on the 'suitability' of the evidence provided. Finally, we summarized if the full review of level B evidence for this specific case is compliant.

Experience from the case studies were used in further detailing and describing the approaches of the stepwise approach or add to the list of potential evidence identified (see Chapter 2).

The list of case studies is presented in Table 21.

Table 21. Forest biomass criteria case studies

Criteria	Country/region	Rationale for the selection
Sustainable Harvesting	USA	Large supply region for EU consumed forest biomass. From the initial Level A analysis, it seemed not all criteria would be met through Level A evidence.
Sustainable Harvesting	Russia	Large supply region for EU consumed forest biomass (especially central and western Russia). From the initial Level A analysis, it seemed not all criteria would be met through Level A evidence
Sustainable Harvesting	Ukraine	Uncertain of all sustainable harvesting criteria could be met at Level A.

Criteria	Country/region	Rationale for the selection
Sustainable Harvesting	Slovakia	One of the criteria is not met at national/subnational level. <i>[Please note that so far, no pellet producer has been identified willing to support the case study, partially because most pellet producers use saw dust and therefore do not have to demonstrate compliance.]</i>
Sustainable Harvesting	Romania	One of the criteria is not met at national/subnational level. <i>[Please note that so far, no pellet producer has been identified willing to support the case study, partially because most pellet producers use saw dust and therefore do not have to demonstrate compliance.]</i>
LULUCF	USA	The US announced to withdraw from the Paris Agreement and will therefore not comply on national level (Level A).

C.2. Findings forest biomass case studies

In the following sections we present the case studies on forest biomass.

Some resulting findings for sustainable harvesting criteria:

- For several elements in the case studies, the answer is currently that data is not available. This is in several cases due to the fact that this information is currently not requested in supplier contracts. However, for many elements the required background information would be available from forest owners (and has been described in the case studies), so could be included in supplier contracts in the future.
- Evidence that is mostly mentioned in the case studies are concessions or declarations of compliance and forest management plans (in some countries already existing/required to be set up by forest owners).
- In some cases, additional effort (beyond including requirements on existing data sources in supplier contracts) will be required. Examples are forest regeneration and long-term production capacity (US) and forest regeneration and long-term production capacity (Russia)
- Specifically for the Russian case study on the element of long-term production capacity, the currently available information on the annual allowable cut, is not very accurate. If this is used for the assessment of the criterion on long term production capacity, there is a risk that the resulting production capacity of forests in Russia will decline. If the public available information would not be used, it will be difficult for operators to prove their compliance. Therefore, it would be advised that the government made calculations on annual allowable cut are improved.
- Specifically for the US case study on the element of long-term production capacity, currently private forest owners do not have any legal obligations on this. It would depend on the size of the sourcing area and the level of detail in the US Forest Service Forest Inventory and Analysis (FIA) program if this would be sufficient to match. Otherwise additional detail level to monitor/determine the annual increment might be required.

Some resulting findings for sustainable harvesting criteria:

- There is currently no readily available database for operators to demonstrate the full compliance with the LULUCF criteria. This will require adding a forward-looking modelling (which can be done based on existing calculators).

Case study – Ukraine (sustainable harvesting criteria)

Background questions

1.	Please indicate which region/location is looked at.
	Answer: Kyiv region, Ukraine
2.	Please indicate in 1-2 sentences why this region is of interest for this specific case study.
	Answer: The forest cover of the region is 20%, which is a little more than the national average (15.9%). In addition, a few big pellets producers are located at the territory of the Kyiv region.
3.	Please indicate if there are specific boundary conditions you want to mention.
	Answer: The forests of the region by their economic purpose and location perform mainly water conservation, protection, sanitation and health functions and have limited operational value. The main part of the region's forests is subordinated to the enterprises of the State Forestry Agency of Ukraine.

Legality of harvest operations at forest sourcing area level

4.i	Is the economic operator a first placer of harvested timber or timber products on the EU market (from inside or outside the EU)? <i>If no, go to question 4.iv.</i>
	Answer: Yes. The state forestry enterprise carries out forestry activities (including felling of all types) and production activities (timber production). The enterprise sells its products in Ukraine, but its customers can export it, in particular to EU countries.
4.ii	The operator has its own due diligence system in place to ensure that forest biomass was legally harvested as defined in the EU Timber Regulation ((EU) 995/2010)?
	Answer: State forestry enterprises generate their own DDS that is performed by the obtaining and collection of the legal documents to prove the legality of the harvesting operations: Forest inventory with the plan and cartographic materials; Approval of annual allowable cut; Forest logging ticket; Receipts for payment of rent for special use of forest resources; Receipts for payment of VAT; Receipts for payment of income tax for permanent forest users or receipts for payment of the single tax for forest users working under the simplified taxation system; Logging maps of cutting areas which reflect nature conservation requirements; Permits for employees to carry out high risk tasks; Evidence of compliance with the radiation measurement requirements; Evidence that salary payments are up to date. In addition, the unified state system of electronic accounting of wood is implemented in Ukraine. To perform the export operations a trader has to obtain the certificates of origin of timber and timber products made of it.
4.iii	The operator is assisted by a recognized monitoring organisation to ensure that forest biomass was legally harvested as defined in the EU Timber Regulation ((EU) 995/2010)?
	Answer: Yes. The enterprise is certified by the FSC certification scheme. There is a national office of FSC in Ukraine. However, the accredited certification body has done the certification process.
4.iv	Traders keep records of their suppliers and customers according to Article 5 of the EU Timber Regulation ((EU) 995/2010)?
	Answer: The record of customers is carried out, records of suppliers is not required by national regulation.

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above? Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access?	Link to source or reference to Annex
Own Due Diligence System (DDS).	Yes	Publicly available for monitoring, paid for the enterprise	[1]
Due Diligence System (DDS) via a recognized monitoring organization.	Yes	Restricted	[2]
Records kept by traders.	Yes	Restricted	

Forest regeneration after harvest

5.i	Does the forest biomass result from final felling or an intermediate felling or clearing of forest area after natural disturbances? <i>If not, forest biomass results from a precommercial thinning or pruning of standing trees. Go to question 6.</i>		
	Answer: Wood is harvested during the final felling, felling of formation and rehabilitation of forests, selective sanitary felling or continuous sanitary felling.		
5.ii	Do supplier contracts require that forest area regeneration is carried out before or after final felling or harvest, either through natural regeneration, planting and seeding, or coppice regrowth and that forest regeneration is done in a manner that ensures quantity and quality of next generation forest resources? <i>If yes, go to question 6.</i>		
	Answer: The forest management plan of the enterprise contains plans for forest regeneration. A project is developed for each of the forest regeneration activity. Works related to forest regeneration are subject to accounting and quality assessment by a special commission. The commission develops the report on the forest regeneration and submits it to the executive bodies to which the enterprise is subordinated. Violation of reforestation rules can be a reason for refusal to issue a logging ticket. A logging ticket is required to obtain approval for logging of forest biomass.		

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access?	Link to source or reference to Annex
Type of forest operation from which forest biomass results (final felling, thinning).	Yes	Public	Logging ticket (for final logging) https://lk.ukrforest.com/ Certificate of wood origin (general view): http://dklg.kmu.gov.ua/forest/document/35486

Possible sources of evidence	Available for this region?	Ease of access?	Link to source or reference to Annex
Securing of forest regeneration is done in a manner that ensures quality and quantity of next generation forest resources (e.g. assessment of abiotic and biotic natural hazards influencing tree species provenances, tree species mixtures etc.).	Yes	Public	Public report of the enterprise: http://makarivlis.com.ua/informacija/informacija-shchodo-sertifikaciji-pidprijemstva.html Forest management plan: http://makarivlis.com.ua/fileadmin/user_upload/%D0%BF%D0%BB%D0%B0%D0%BD_%D0%BB%D1%81%D0%BE%D1%83%D0%BF%D1%80%D0%B0%D0%B2%D0%BB%D0%BD%D0%BD%D1%8F_2020.doc

Protected areas

6.i	Does the forest sourcing area include areas designated by international or national law of the relevant competent authority for nature protection purposes, including wetlands and peatlands, as protected? <i>If no, go to question 7.</i>		Answer: Yes. The nature reserve fund includes seven objects with a total area of 1464.32 hectares, which is 5.5% of the total area of the forest. The final felling is prohibited at these territories. Other types of felling are allowed with restrictions.
6.ii	Do supplier contracts contain the provision of conditions statements from the relevant competent authority?		Answer: To conduct the felling of formation and rehabilitation of forests, selective sanitary felling and continuous sanitary felling the permission of the relevant regulatory body (state forestry committee and local administration) and state ecological inspection must be obtained. The permission ('forestry ticket') is based on materials including a forest management plan and sanitary and forest pathological examination.
6.iii	Do supplier contracts contain the required implementation evidence of the measures specified in the conditions statement?		Answer: A forestry ticket for any felling within the territory of the nature reserve fund should be obtained before wood could be sold as a feedstock.
6.iv	If forest operations are restricted in the nature protection areas, do suppliers contracts require the official approval for biomass removal in the protected area obtained from the relevant competent authority (including wetlands and peatlands)?		Answer: Reasoning for biomass collection must be substantiated when applying for a forestry ticket (meaning a project is being developed where the arguments for removal are given).

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above? Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access?	Link to source or reference to Annex
Condition statements from statutory bodies regarding protected areas including stipulated measures and prohibitions in the protected areas, including wetlands and peatlands	Yes	Public	Charters of the objects of the nature reserve fund. Examples: https://menr.gov.ua/files/docs/nakazy/2019/nakaz_219.pdf http://cbr.nature.org.ua/doc/pol_cbr.pdf
Evidence of implementation of plans/measures in nature protection areas	Yes	Restricted	Reports of the object of the nature reserve fund to the local authorities and the relevant ministry
Permissions for biomass removal in protected areas including wetlands and peatlands.	Yes	Public	Projects of organization of the territory of the nature reserve fund objects. General content of the project: https://zakon.rada.gov.ua/laws/show/z0831-05 Example: http://www.npptovtry.org.ua/wp-content/uploads/2018/03/project_org.pdf Forestry ticket

Maintenance of soil quality and biodiversity with the aim of minimizing negative impacts

7.i	Do poor or vulnerable soils exist in the forest sourcing area? <i>If no, go to question 8.i.</i>
	Answer: Yes
7.ii	Do supplier contracts require harvesting permission of the relevant competent authority in sensitive areas in the forest sourcing area (e.g. poor vulnerable or sensitive soils) and confirmation of appropriate precautionary measures and harvesting procedures in these areas? <i>If no, go to question 8.ii.</i>
	Answer: This issue is taken into account during the development of forest management plan by the Ukrainian State Project Forest Management Production Association (USFMPA - state company that was established for the purpose of forest management on the entire territory of the forest fund of Ukraine). A forest management plan is developed for each state forestry enterprise. USFMPA provides a forest soil survey that determines the properties of soils, possibility of growing plantations of different tree species, selection of target tree species and recommendations for forestry practices on different types of soils and forests.
8.i	Does the biomass include stumps and residues? <i>If no, go to question 9.i.</i>
	Answer: No
8.ii	Do suppliers contracts require that evidence is provided to confirm that stumps or residues have not been harvested inappropriately from poor vulnerable soils? <i>If no, go to question 9.ii.</i>
	Answer:
9.i	Do supplier contracts require that harvesting operations take into account biodiversity attributes to minimise the impact on native forest types, habitat features, rare and endangered species and their habitats, stipulated and recommended deadwood types and amounts?

	Answer: This issue is taken into account during the development of forest management plan by the Ukrainian State Project Forest Management Production Association (state company that was established for the purpose of forest management on the entire territory of the forest fund of Ukraine). A forest management plan is developed for each state forestry enterprise. USFMFA provides recommendations for strengthening protection of biodiversity attributes through identification of rare and endangered species, their monitoring and protection, carrying out of inspections of the wood plots before felling, mapping of growth places of populations of rare and endangered species.
9.ii	Do suppliers contracts require the proof that avoidable damage (e.g. to the soil and the remaining stand) due to the harvesting operations has not occurred and that negative impacts due to harvesting operations have been minimised?
	Answer: This issue is taken into account during the development of forest management plan by the Ukrainian State Project Forest Management Production Association (state company that was established for the purpose of forest management on the entire territory of the forest fund of Ukraine). Forest management plan is developed for each state forestry enterprise. USFMFA provides for each felling area a map of the technological process of logging that includes Act of inspection of the felling area with planned measures for minimizing the negative impact of felling on the forest and environment.

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above? Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access?	Link to source or reference to Annex
The existence of poor or vulnerable soils in the forest sourcing area.	Yes	Public	Detailed field inventory data are available in the Forest management plan of the enterprise: http://makarivlis.com.ua/fileadmin/user_upload/%D0%BF%D0%BB%D0%B0%D0%BD_%D0%BB%D1%81%D0%BE%D1%83%D0%BF%D1%80%D0%B0%D0%B2%D0%BB%D0%BD%D0%BD%D1%8F_2020.doc
Harvesting of forest biomass on poor or vulnerable soils	Yes	Public	Forest management plan issued by the relevant state company contains justification for all the types of harvesting, including that on poor soils (if necessary): http://makarivlis.com.ua/fileadmin/user_upload/%D0%BF%D0%BB%D0%B0%D0%BD_%D0%BB%D1%81%D0%BE%D1%83%D0%BF%D1%80%D0%B0%D0%B2%D0%BB%D0%BD%D0%BD%D1%8F_2020.doc
Stump or residue removal	Yes	Public	Forestry ticket
Consideration and minimizing of negative impacts on biodiversity features	Yes	Public	Environmental impact assessment (EIA) of the planned activity of the forestry contains the list of the possible effects of the enterprise activities on the flora and fauna and mitigation measures: http://makarivlis.com.ua/fileadmin/user_upload/%D0%9E%D0%92%D0%9D%D0%A1_2019.doc Report to the public on the monitoring activities contains the list of measures that have been implemented to mitigate the impact on the biodiversity: http://makarivlis.com.ua/fileadmin/user_upload/%D0%97%D0%92%D0%A2_%D0%9C%D0%9E%D0%9D%D0%A2%D0%9E%D0%A0%D0%98%D0%9D%D0%93_2019.doc

Possible sources of evidence	Available for this region?	Ease of access?	Link to source or reference to Annex
Minimization of impacts on soil and remaining stand	Yes	Public	<p>Environmental impact assessment contains the possible impact on geological structures and soils and mitigation measures: http://makarivlis.com.ua/fileadmin/user_upload/%D0%9E%D0%92%D0%9D%D0%A1_2019.doc</p> <p>Report to the public on the monitoring activities contain the list of measures that have been implemented to mitigate the impact on soils: http://makarivlis.com.ua/fileadmin/user_upload/%D0%97%D0%92%D0%A2_%D0%9C%D0%9E%D0%9D%D0%A2%D0%9E%D0%A0%D0%98%D0%9D%D0%93_2019.doc</p>

Maintenance or improvement of the long-term production capacity of the forest

10.i	Does data exist on the harvested wood amounts and net annual increments as part of the forest sourcing area? <i>If no, pass the rest of the questions.</i>	Answer: yes
10.ii	Do average annual harvested timber amounts NOT exceed the average net annual increment (e.g. an average measured over a 5-year period)? <i>If yes, pass the rest of the questions.</i>	Answer: Yes, the annual harvest does not exceed annual increment.
11.i	In the forest sourcing area, do average annual harvest levels exceed the average net annual increment? Due to restructuring of even-aged woodlands? Habitat management or restoration of biodiversity? Or a response to pest, disease or storm damage?	Answer:
11.ii	Do permits exist to mention or justify this in the case of exceptional higher harvest levels? <i>If yes, pass next question.</i>	Answer:

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above? Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access?	Link to source or reference to Annex
Sustainable harvest levels	Yes	Public	Report to the public on the monitoring activities provides the information on the volumes of planned and executed forestry activities (the amounts of forest reproduction, the final felling, logging of forest formation and rehabilitation, etc.): http://makarivlis.com.ua/fileadmin/user_upload/%D0%97%D0%92%D0%A2_%D0%9C%D0%9E%D0%9D%D0%A2%D0%9E%D0%A0%D0%98%D0%9D%D0%93_-2019.doc
Harvest amounts exceed net annual increments	Yes	Public	Forest management plan developed by the USFMPA contains the justification of the size of the estimated felling: http://makarivlis.com.ua/fileadmin/user_upload/%D0%BF%D0%BB%D0%B0%D0%BD_%D0%BB%D1%81%D0%BE%D1%83%D0%BF%D1%80%D0%B0%D0%B2%D0%BB%D0%BD%D0%BD%D1%8F_2020.doc If harvested amounts exceed net annual increments, the justification will be presented into the Report to the public and into the annual report to the state forestry committee. This could be caused only by natural disturbances (drying, pests, natural disasters) and forestry tickets should be obtained for any felling activities.

Background information

1. Analysis of the legislative framework on timber flow control system in Ukraine and development of improved proposals. Pavlo Kravets. April-June 2014. FLEG II (ENPI East) Programme. http://www.enpi-fleg.org/site/assets/files/1892/analysis_of_the_legislative_framework_on_timber_flow_control_system_in_ukraine_and_development_of_improved_proposals.pdf
2. IMPLEMENTATION GUIDE FOR COMPANIES TRADING FSC-CERTIFIED MATERIALS IN THE EUROPEAN UNION
<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjxkJWEplbqAhWSsaQKHePJB80QFjAAegQIARAB&url=https%3A%2F%2Fic.fsc.org%2Ffile-download.eu-timber-regulation-implementation-guide.a-13.pdf&usg=AOvVaw1-Kh-yzGZABiX32sSS4bNP>

Example evidence

Figure 22. Map of the forestry enterprise

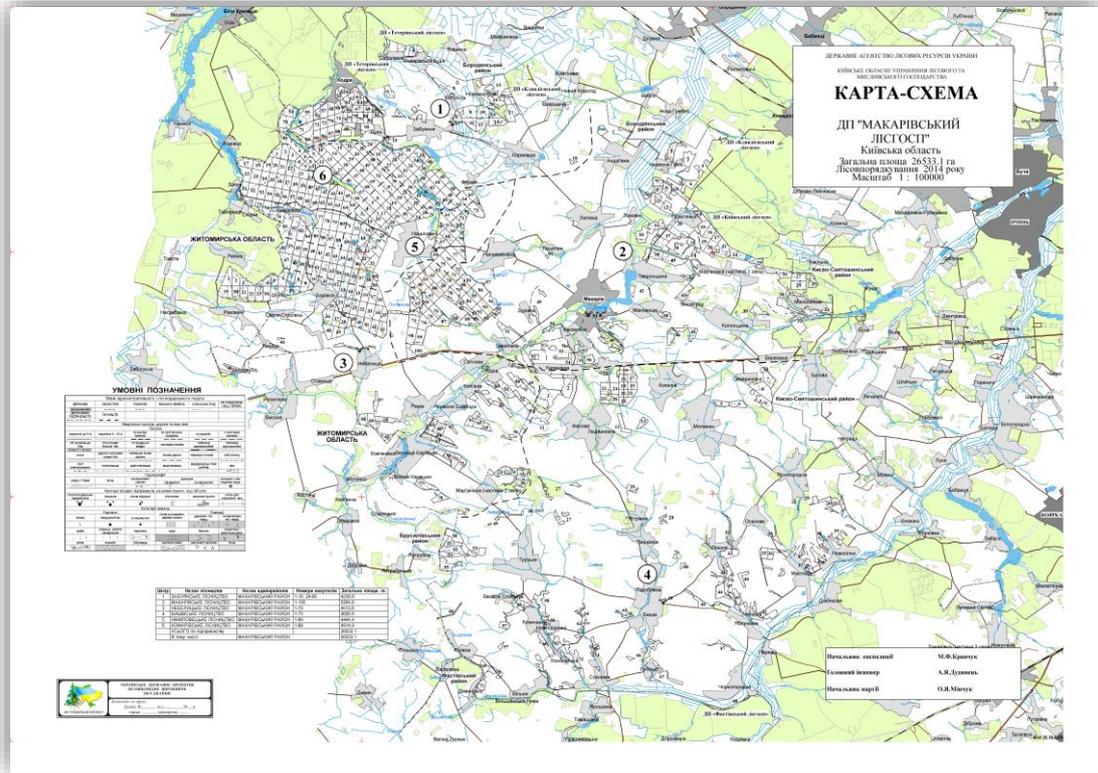


Figure 23. Example of a Ukrainian logging ticket (page 1)

Серія 02 ЛКБ
№503753



ЛІСОРУБНИЙ КВИТОК
« 24 » травня 2016 р.

Область Закарпатська Власник лісів або постійний лісокористувач ДП "ВЕЛИКОБЕРЕЗНЯНСЬКЕ ЛГ"
Лісництво Лютянське Система рубок РГК - суцільні
Вид, спосіб рубки суцільна вузьколосісна Спосіб обліку за площею
На підставі наказу Міністерства екології та природних ресурсів № 603 від 22.11.2012 р.
(наказ Мінприроди про затвердження розрахункової лісооски, дата і номер, акт обстеження, прилипи тощо)

дозволяється ДП "ВЕЛИКОБЕРЕЗНЯНСЬКЕ ЛГ"
(найменування лісокористувача)
рубати в рахунок ліміту лісоосічного фонду 2016 року
(назва заходу)
Лісотаксовий пояс другий Розряд такс четвертий

Категорія лісів	Номер варіанту	Номер виділу ділянки	Площа ділянки, гектарів	Головність	Забезпечення збереження підрослі		Маса деревини, куб. метри					Нормативна вартість, гривень				Надлежить сплатити з урахуванням індексації (звички), гривень		
					на площу, гектарів	кількість тис. для кв. гектар	диляної	древини	разом лесоосічного фонду	лежачої	з корони	корою	разом	диляної	древини		лежачої	корою
4	13	18	1,1	щп			118	70	188	3	114	305	7878	235	4	-	8117	8117

Figure 24. Example of a Ukrainian logging ticket (page 2)

Підстава для індексації (зніжки) _____

Строк внесення плати за деревину, що відпускається _____ згідно строку оплати _____

Вирубуванню не підлягають: Дерева за межами лісосіки.

Строк закінчення заготівлі: 31 грудня 2018 р.

Вивезення дозволяється: одночасно із заготівлею

Строк закінчення вивезення: 31 березня 2019 р.

Умови зберігання деревини: _____

Спосіб очищення: лорубочні рештки подрібнити на відрізки до 1 м, скласти в купу у місці вільні від підросту, та на трельовальний волон

Розробка лісосік проводиться згідно із технологічними картами.

Особливі умови: _____

 Лісорубний квиток видав _____ (підпис)

Лісорубний квиток випускає _____ (підпис)

Лісокористувачі зобов'язані дотримуватися вимог Порядку спеціального використання лісових ресурсів.

За порушення Порядку спеціального використання лісових ресурсів заготівля деревини може бути припинена в установленому порядку.

З Порядком спеціального використання лісових ресурсів і Правилами пожежної безпеки ознайомлений _____

Лісокористувач _____ (підпис)

Відмітка про надання відстроки на заготівлю та вивезення деревини: _____

Figure 25. Translation of the Ukrainian logging ticket to fill-in

Series _____ STATE COAT OF ARMS OF UKRAINE

N _____

LOGGING TICKET

" _____ " _____ 20____ .

REGION (oblast): _____

Forest owner or permanent forest user: _____

Forestry: _____

Felling system: _____

Type of felling: _____

Type of accounting: _____

On the basis of _____ (order on approval of the estimated felling, date and number, survey report, instructions, etc.)
allowed _____ (name of the forest user)
felling into the account _____ (name of the activity)

Forest tax belt _____ Rank taxes _____

Figure 26. Translation of the Ukrainian forestry ticket to fill-in

FORESTRY TICKET
“ ___ ” _____ 20__ p.

Region _____ District _____

Forest owner or permanent forest user: _____
Forestry: _____

On the basis of : _____
allowed _____ (name of the forest user, his address)
to carry out _____ in the amounts: _____ (type of special use of forest resources)

Category of forests	Quarter number	Allocation number, plot	Area, hectares	Allowed amount of use		Unit price, hryvnias	Total amount, hryvnias
				Unit	Amount		
Total							

Deadline for payment for the use of forest resources: _____
Special conditions: _____
Term of use from: “ ___ ” _____ 20__ to “ ___ ” _____ 20__
Stamp _____

Forestry ticket issued by _____ (signature)

Forest user is acquainted with the Rules of harvesting of secondary forest materials and implementation of secondary forest uses, the Rules of use of useful properties of forests and the Rules of fire safety in forests.

Forest user _____ (signature)
Note on the results of the use of forest resources (useful properties of forests) and payment

Case study – USA (sustainable harvesting criteria)

Background questions

1.	Please indicate which region/location is looked at.
	Answer: North Carolina, USA
2.	Please indicate in 1-2 sentences why this region is of interest for this specific case study.
	Answer: North Carolina has a robust forest products market for export pellets and 58% of the state's land area is occupied by forested areas that are available for timber production.
3.	Please indicate if there are specific boundary conditions you want to mention.
	Answer: Only the eastern half of the state has forests within the export pellet market "woodshed".

Legality of harvest operations at forest sourcing area level

4.i	Is the economic operator a first placer of harvested timber or timber products on the EU market (from inside or outside the EU)? <i>If no, go to question 4.iv.</i>
	Answer: Yes.
4.ii	The operator has its own due diligence system in place to ensure that forest biomass was legally harvested as defined in the EU Timber Regulation ((EU) 995/2010)?
	Answer: Yes. ENVIVA, as the case study operator, developed their own "track and trace" system to ensure the raw materials delivered to their mills were harvested legally. ENVIVA is the world's largest pellet producer and owns and operates four pellet mills in North Carolina with a total capacity of over two million metric tonnes per year. ENVIVA pellet plants source biomass mostly from pine and hardwood species from surrounding forests and partly from sawmill residues. ENVIVA's pellets are primarily shipped to Europe for power production. Two mills, Hamlet and Ahoskie, were used as the basis for this case study. Recent supply base reports from 2019 audits conducted by the Sustainable Biomass Partnership provide the basis for much of the results below.
4.iii	The operator is assisted by a recognized monitoring organisation to ensure that forest biomass was legally harvested as defined in the EU Timber Regulation ((EU) 995/2010)?
	Answer: No.
4.iv	Traders keep records of their suppliers and customers according to Article 5 of the EU Timber Regulation ((EU) 995/2010)?
	Answer: In this case, the operators and traders are one and the same. They keep detailed records of their suppliers and the source of the supply (the timberland owner). Records of the location of the source tract/parcel is also maintained.

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Own Due Diligence System (DDS)	Yes	DDS framework available publicly; specific results are restricted	https://www.envivabiomass.com/sustainability/responsible-sourcing/track-trace/ Self-reported harvest data by forest property owner. No requirement for professional forester to be involved/certify data accuracy. Third party verification in place.
Due Diligence System (DDS) via a recognized monitoring organization	No	Public, but must be requested specifically; not searchable on agency website	
Records kept by traders	Yes		In the NC case study with ENVIVA as the dominant pellet producer, operators and traders are one and the same

Forest regeneration after harvest

5.i	Does the forest biomass result from final felling or an intermediate felling or clearing of forest area after natural disturbances? <i>If not, forest biomass results from a precommercial thinning or pruning of standing trees. Go to question 6.</i>
	Answer: Yes
5.ii	Do supplier contracts require that forest area regeneration is carried out before or after final felling or harvest, either through natural regeneration, planting and seeding, or coppice regrowth and that forest regeneration is done in a manner that ensures quantity and quality of next generation forest resources? <i>If yes, go to question 6.</i>
	Answer: Yes for the first three parts of the question. Operators ensure that the harvested area (if final felling) will be replanted or regrown through natural regeneration as forested land. Operators will not enter into a contract with a supplier on any lands where trees are to be felled to facilitate conversion to non-forest uses. However long-term evaluation of regeneration success by operators isn't currently feasible and there is no legal mandate requiring it. Operators are developing remote sensing tools to help gauge long term success of regeneration efforts.

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Type of forest operation from which forest biomass results (final felling, thinning)	Yes, for tracts where current biomass operators are involved	Restricted; information is held by operators. Exception would be if harvest occurs on federal land or is audited by NC Forest Service to e.g. monitor voluntary BMP implementation.	
Securing of forest regeneration is done in a manner that ensures quality and quantity of next generation forest resources (e.g. assessment of abiotic and biotic natural hazards influencing tree species provenances, tree species mixtures etc.)	No. There is no legal mandate regarding quality, quantity, species, etc. of forest regeneration		

Protected areas

6.i	Does the forest sourcing area include areas designated by international or national law of the relevant competent authority for nature protection purposes, including wetlands and peatlands, as protected? <i>If no, go to question 7.</i>
	Answer: Yes. Only federal lands contain nationally designated nature protection areas. Any timber harvesting on these lands will be both instigated by and closely regulated by the applicable federal agency. In North Carolina this would include US Forest Service lands, US Department of Defence lands, and National Wildlife Refuges (managed by the US Fish & Wildlife Service). Protected areas in the US can be identified through the GAP Analysis Project's website. ⁹⁸ Additionally, Enviva has conducted a Forest Stewardship Council Controlled Wood Risk Assessment (FSC US Controlled Wood National Risk Assessment V1-0 D3-0) that requires mapping of protected areas to determine risk. ⁹⁹
6.ii	Do supplier contracts contain the provision of conditions statements from the relevant competent authority?
	Answer: Yes. Any supplier providing raw material from federally managed lands will be working under federal contracts that are available to and monitored by the operators.
6.iii	Do supplier contracts contain the required implementation evidence of the measures specified in the conditions statement?
	Answer: No. ENVIVA's track and trace system relies on self-reporting of forest owners. Evidence is provided through third-party verification, in part relying on harvest site-access for areas identified as high risk under FSC's controlled wood standard.
6.iv	If forest operations are restricted in the nature protection areas, do suppliers contracts require the provision of biomass removal in the protected area obtained from the relevant competent authority (including wetlands and peatlands)?
	Answer:

⁹⁸ <https://www.usgs.gov/core-science-systems/science-analytics-and-synthesis/gap/science/protected-areas>

⁹⁹ See page 61: https://sbp-cert.org/wp-content/uploads/2019/09/Supply-Base-Report-v1.3_Main-Audit_Enviva-Pellets-Hamlet-FINAL.pdf

	Yes. Supplier contracts in these situations will be drawn up by the federal agency that owns/manages the nature protection area.
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Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Condition statements from statutory bodies regarding protected areas including stipulated measures and prohibitions in the protected areas, including wetlands and peatlands	Yes. Any nationally designated nature protection areas will have management plans that stipulate measures and prohibitions	Public	National Forest, DOD, or National Wildlife Refuge management plans (specific to that Forest, military base, or Refuge)
Evidence of implementation of plans/measures in nature protection areas	Yes, for federal lands. Any federal agency will monitor for quality control and report on active forest operations	Public upon specific request	(Federally) protected area specific management plans within NC
Permissions for biomass removal in protected areas including wetlands and peatlands	Will be stated in the agency contract if biomass removal is allowed or not	Contract template available publicly through the responsible agency (e.g. US Fish and Wildlife Service, US Forest Service, Bureau of Land Management, Department of Defence), but not specific executed contracts	

Maintenance of soil quality and biodiversity with the aim of minimizing negative impacts

7.i	Do poor or vulnerable soils exist in the forest sourcing area? <i>If no, go to question 8.i.</i>
	Answer: Yes. Typically, the most vulnerable soils would be saturated types that are periodically inundated. North Carolina Forest Best Management Practices (BMPs) address protection of these types of soils. The SSURGO database of the US Department of Agriculture contains information on soils. ¹⁰⁰ Soil surveys specific to North Carolina can be downloaded as well. ¹⁰¹
7.ii	Do supplier contracts require harvesting permission of the relevant competent authority in sensitive areas in the forest sourcing area (e.g. poor vulnerable or sensitive soils) and confirmation of appropriate precautionary measures and harvesting procedures in these areas? <i>If no, go to question 8.ii.</i>
	Answer:

¹⁰⁰ https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053627

¹⁰¹ <https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?statel=NC> wha

	Permission is not required prior to harvest on private lands in general, but any harvest or other silvicultural activity done in federally jurisdictional wetlands as determined by the US Army Corps of Engineers must comply with Section 404 silvicultural exemption of the Clean Water Act. If the harvest is not part of a silvicultural activity, then federal permits are required prior to any activity.
8.i	Does the biomass include stumps and residues? <i>If no, go to question 9.i.</i>
	Answer: No. Stumps are not accepted in North Carolina export biomass market, nor are logging residues.
8.ii	Do suppliers contracts require that evidence is provided to confirm that stumps or residues have not been harvested inappropriately from poor vulnerable soils? <i>If no, go to question 9.ii.</i>
	Answer: No, but stump and residue removal are not part of a harvest operation in North Carolina. This requirement would therefore not be applicable in this case.
9.i	Do supplier contracts require that harvesting operations take into account biodiversity attributes to minimise the impact on native forest types, habitat features, rare and endangered species and their habitats, stipulated and recommended deadwood types and amounts?
	Answer: Yes. Operators will only purchase from suppliers that have addressed the unique needs of High Conservation Value Forests and/or Rare, Threatened or Endangered species and their habitats. Operators have declared they will not accept any supply from certain (self-selected) rare forest types.
9.ii	Do suppliers contracts require the proof that avoidable damage (e.g. to the soil and the remaining stand) due to the harvesting operations has not occurred and that negative impacts due to harvesting operations have been minimised?
	Answer: Yes. Operators conduct post-harvest audits to ensure compliance with state voluntary best management practices to protect water quality and soil health.

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
The existence of poor or vulnerable soils in the forest sourcing area	Yes. USDA NRCS soils maps and data available for entire state. Wetland determination can be requested from applicable agencies	Public	North Carolina Soil maps: https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=NC
Harvesting of forest biomass on poor or vulnerable soils	No		
Stump or residue removal	No		

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Consideration and minimizing of negative impacts on biodiversity features	Yes, but only for features that are identified as having high biological diversity by public and/or private entities	Mixture of public and private (element occurrences on private lands with undisclosed locations)	https://www.ncnhp.org/data/species-community-search
Minimization of impacts on soil and remaining stand	Partially. Operator, supplier, and NC Forest Service harvest audits focus on BMPs for soil and water quality, not health/quality of remaining stand	Private; possibly public by special request	https://www.ncforests-service.gov/water-quality/bmp-manual.htm

Maintenance or improvement of the long-term production capacity of the forest

10.i	Does data exist on the harvested wood amounts and net annual increments as part of the forest sourcing area? <i>If no, pass the rest of the questions.</i>		
	Answer: No. The only long term published growth to drain forest data available is through the US Forest Service Forest Inventory and Analysis (FIA) program. FIA data are continuous forest inventory plots remeasured every ~5-10 years across all land ownership classes and include any forest area meeting the following criteria: "forested areas that are undeveloped or "not developed for non-forest land users", are at least an acre in size and 120' in width, and contain a "live plus missing" canopy cover of at least 10 percent". Each plot represents ~ 2,000 ha. Data are not available on an individual ownership level (e.g., tract or parcel). The EVALIDator tool allows for an efficient and user-friendly analysis of FIA data with a limited set of predefined queries. ¹⁰² There is not a mandate for sustainable harvest yields on private forest lands. US National Forests (federal) are mandated to maintain sustainable harvest levels (growth exceeds harvest).		
10.ii	Do average annual harvested timber amounts NOT exceed the average net annual increment (e.g. an average measured over a 5-year period)? <i>If yes, pass the rest of the questions.</i>		
	Answer: Yes. Recent North Carolina state-wide FIA data show increasing trend in merchantable and total volume. The trend holds at the county level (smaller spatial scale). Source: See Annex for screenshot of FIA Report run June 15, 2020.		
11.i	In the forest sourcing area, do average annual harvest levels exceed the average net annual increment? Due to restructuring of even-aged woodlands? Habitat management or restoration of biodiversity? Or a response to pest, disease or storm damage?		
	Answer: [ref 10.ii answer: this question can be passed]		
11.ii	Do permits exist to mention or justify this in the case of exceptional higher harvest levels? <i>If yes, pass next question.</i>		
	Answer: [ref 10.ii answer: this question can be passed]		

¹⁰² <https://apps.fs.usda.gov/Evalidator/evaluator.jsp>

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Sustainable harvest levels	No, except at the macro scale using FIA data	Public	https://apps.fs.usda.gov/Evalidator/evaluator.jsp
Harvest amounts exceed net annual increments	No, except by extrapolating from the FIA data at a relevant county or defined extent that includes FIA plot locations	Public	https://apps.fs.usda.gov/Evalidator/evaluator.jsp

Background information

Example evidence:

6/15/2020

EVALIDator Version 1.8.0.01

EVALIDator Version 1.8.0.01 - View report

Numerator attribute number and description: 0202 Average annual net growth of merchantable bole volume of growing-stock trees (at least 5 inches d.b.h.), in cubic feet, on forest land

Denominator attribute number and description: 0002 Area of forest land, in acres

This ratio estimate is based on the plot area that was forest land at both the beginning and end of the remeasurement period. This provides a more realistic ratio estimate of the actual change component (growth, removals, mortality) that has occurred on lands that remain in the forest land base.

FIADEF as the forest land definition.

State/EVAL_GRP(s):

North Carolina 372019

Page variable=None (based on values from the Current inventory).

Row variable=County code and name (based on values from the Current inventory).

Column variable=All live stocking (based on values from the Current inventory).

Filtering clause(s) applied to numerator:

Filtering clause(s) applied to numerator and denominator:

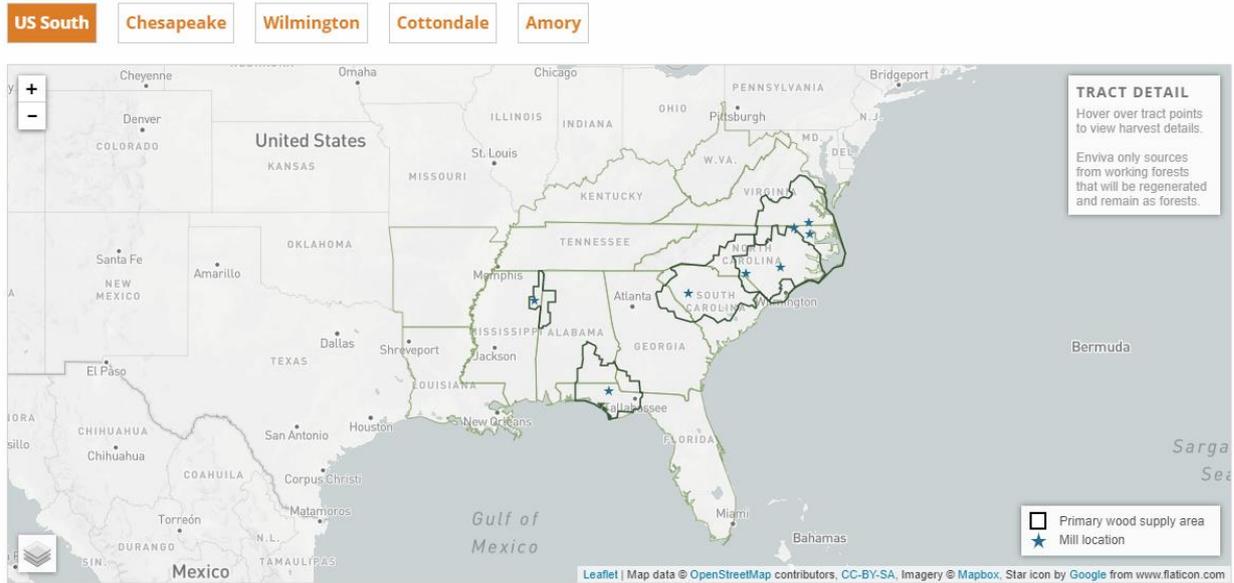
Ratio estimate:

County code and name	All live stocking					
	Total	Overstocked	Fully stocked	Medium stocked	Poorly stocked	Nonstocked
Total	84.5617	122.7906	96.3686	65.3641	36.5173	37.1019
37001 NC Alamance	75.5443	54.0499	102.0887	60.5659	18.5825	-
37003 NC Alexander	54.8614	20.3207	72.3466	45.8681	45.9427	-
37005 NC Alleghany	92.0064	-5.2519	121.3039	37.1502	-	119.7497
37007 NC Anson	128.1617	58.7749	180.2173	95.2955	93.7314	-
37009 NC Ashe	79.3176	73.4468	96.7866	70.0686	-19.3846	-
37011 NC Avery	26.4930	58.6117	12.0148	27.7280	18.4552	-
37013 NC Beaufort	108.6672	147.8957	130.9396	94.9653	46.4177	62.6432
37015 NC Bertie	129.9179	173.7100	131.0944	111.2979	21.5253	-
37017 NC Bladen	86.5839	129.9617	98.8519	65.4199	38.9734	47.5545
37019 NC Brunswick	90.3815	102.9636	121.9403	57.2005	44.0089	31.5170
37021 NC Buncombe	49.7412	67.0466	56.7161	26.6198	27.3975	-
37023 NC Burke	71.3588	79.5963	83.8384	57.4370	55.5479	-
37025 NC Cabarrus	69.6120	23.3100	102.5658	51.4188	-40.5369	99.4069
37027 NC Caldwell	68.1475	86.0435	59.3336	85.1598	48.1381	35.1590
37029 NC Camden	42.3156	-17.3146	155.9722	3.7428	42.6497	-
37031 NC Carteret	71.9609	139.1588	67.7940	65.7070	23.5014	1.6255
37033 NC Caswell	71.2571	73.1718	89.4413	35.3086	41.5991	-
37035 NC Catawba	80.2501	69.0180	80.8226	90.8172	99.5874	-
37037 NC Chatham	133.5102	144.1589	148.8466	116.3973	71.1277	-
37039 NC Cherokee	52.3448	62.5318	53.6408	49.2491	48.0164	-
37041 NC Chowan	134.0621	-	168.9250	160.0120	-18.3689	-
37043 NC Clay	32.3482	54.3861	61.5339	1.4034	41.8940	-
37045 NC Cleveland	85.2896	173.6133	94.3151	56.0643	37.2781	-

Question 12. Supply Area Map Example

Enviva wood supply map

Choose a supply area to explore harvests Enviva sourced from during the time period spanning July through December 2019. Hover over points to view harvest details. **Please note that the information and data contained on the following web page is for general information purposes only and may not be reproduced, copied, sold, excerpted or removed without prior written consent from Enviva.**



Source: <https://www.envivabiomass.com/sustainability/responsible-sourcing/wood-supply-map/#5/33.146/-84.930>

Question 15. Stand History information examples:

ENVIVA TRACT SETUP SHEET

Stand-Level Information



FORM GUIDANCE Please provide information for at least one stand. Complete stands 2-5, if information is available. Multiple stand definition: Different harvest type, forest type, or age class within the harvest area.

	Stand 1	Stand 2	Stand 3	Stand 4	Stand 5
Was stand established by planting?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown				
How will stand be regenerated after harvest? <small>* As prior to harvest</small>	<input type="checkbox"/> Planted- same species* <input type="checkbox"/> Planted- different species* <input type="checkbox"/> Planted- unknown species <input type="checkbox"/> Naturally regenerated <input type="checkbox"/> Unknown	<input type="checkbox"/> Planted- same species* <input type="checkbox"/> Planted- different species* <input type="checkbox"/> Planted- unknown species <input type="checkbox"/> Naturally regenerated <input type="checkbox"/> Unknown	<input type="checkbox"/> Planted- same species* <input type="checkbox"/> Planted- different species* <input type="checkbox"/> Planted- unknown species <input type="checkbox"/> Naturally regenerated <input type="checkbox"/> Unknown	<input type="checkbox"/> Planted- same species* <input type="checkbox"/> Planted- different species* <input type="checkbox"/> Planted- unknown species <input type="checkbox"/> Naturally regenerated <input type="checkbox"/> Unknown	<input type="checkbox"/> Planted- same species* <input type="checkbox"/> Planted- different species* <input type="checkbox"/> Planted- unknown species <input type="checkbox"/> Naturally regenerated <input type="checkbox"/> Unknown
Describe this stand's stocking preharvest	<input type="checkbox"/> Understocked <input type="checkbox"/> Fully stocked <input type="checkbox"/> Overstocked	<input type="checkbox"/> Understocked <input type="checkbox"/> Fully stocked <input type="checkbox"/> Overstocked	<input type="checkbox"/> Understocked <input type="checkbox"/> Fully stocked <input type="checkbox"/> Overstocked	<input type="checkbox"/> Understocked <input type="checkbox"/> Fully stocked <input type="checkbox"/> Overstocked	<input type="checkbox"/> Understocked <input type="checkbox"/> Fully stocked <input type="checkbox"/> Overstocked
Estimated tons to Enviva					
Forest cover type	<input type="checkbox"/> Pine w/ HW understory <input type="checkbox"/> Pine w/ NO HW understory <input type="checkbox"/> Mixed Pine- Hardwood <input type="checkbox"/> Bottomland Hardwood <input type="checkbox"/> Other Hardwood	<input type="checkbox"/> Pine w/ HW understory <input type="checkbox"/> Pine w/ NO HW understory <input type="checkbox"/> Mixed Pine- Hardwood <input type="checkbox"/> Bottomland Hardwood <input type="checkbox"/> Other Hardwood	<input type="checkbox"/> Pine w/ HW understory <input type="checkbox"/> Pine w/ NO HW understory <input type="checkbox"/> Mixed Pine- Hardwood <input type="checkbox"/> Bottomland Hardwood <input type="checkbox"/> Other Hardwood	<input type="checkbox"/> Pine w/ HW understory <input type="checkbox"/> Pine w/ NO HW understory <input type="checkbox"/> Mixed Pine- Hardwood <input type="checkbox"/> Bottomland Hardwood <input type="checkbox"/> Other Hardwood	<input type="checkbox"/> Pine w/ HW understory <input type="checkbox"/> Pine w/ NO HW understory <input type="checkbox"/> Mixed Pine- Hardwood <input type="checkbox"/> Bottomland Hardwood <input type="checkbox"/> Other Hardwood
Harvest type	<input type="checkbox"/> Arboriculture/Salvage <input type="checkbox"/> Clearcut <input type="checkbox"/> Preharvest <input type="checkbox"/> Seed tree <input type="checkbox"/> Selection <input type="checkbox"/> Thinning	<input type="checkbox"/> Arboriculture/Salvage <input type="checkbox"/> Clearcut <input type="checkbox"/> Preharvest <input type="checkbox"/> Seed tree <input type="checkbox"/> Selection <input type="checkbox"/> Thinning	<input type="checkbox"/> Arboriculture/Salvage <input type="checkbox"/> Clearcut <input type="checkbox"/> Preharvest <input type="checkbox"/> Seed tree <input type="checkbox"/> Selection <input type="checkbox"/> Thinning	<input type="checkbox"/> Arboriculture/Salvage <input type="checkbox"/> Clearcut <input type="checkbox"/> Preharvest <input type="checkbox"/> Seed tree <input type="checkbox"/> Selection <input type="checkbox"/> Thinning	<input type="checkbox"/> Arboriculture/Salvage <input type="checkbox"/> Clearcut <input type="checkbox"/> Preharvest <input type="checkbox"/> Seed tree <input type="checkbox"/> Selection <input type="checkbox"/> Thinning
Age class	<input type="checkbox"/> 0-10 <input type="checkbox"/> 11-20 <input type="checkbox"/> 21-30 <input type="checkbox"/> 31-40 <input type="checkbox"/> 41-50 <input type="checkbox"/> 51-60 <input type="checkbox"/> 61-70 <input type="checkbox"/> 71-80 <input type="checkbox"/> 81-90 <input type="checkbox"/> 90+	<input type="checkbox"/> 0-10 <input type="checkbox"/> 11-20 <input type="checkbox"/> 21-30 <input type="checkbox"/> 31-40 <input type="checkbox"/> 41-50 <input type="checkbox"/> 51-60 <input type="checkbox"/> 61-70 <input type="checkbox"/> 71-80 <input type="checkbox"/> 81-90 <input type="checkbox"/> 90+	<input type="checkbox"/> 0-10 <input type="checkbox"/> 11-20 <input type="checkbox"/> 21-30 <input type="checkbox"/> 31-40 <input type="checkbox"/> 41-50 <input type="checkbox"/> 51-60 <input type="checkbox"/> 61-70 <input type="checkbox"/> 71-80 <input type="checkbox"/> 81-90 <input type="checkbox"/> 90+	<input type="checkbox"/> 0-10 <input type="checkbox"/> 11-20 <input type="checkbox"/> 21-30 <input type="checkbox"/> 31-40 <input type="checkbox"/> 41-50 <input type="checkbox"/> 51-60 <input type="checkbox"/> 61-70 <input type="checkbox"/> 71-80 <input type="checkbox"/> 81-90 <input type="checkbox"/> 90+	<input type="checkbox"/> 0-10 <input type="checkbox"/> 11-20 <input type="checkbox"/> 21-30 <input type="checkbox"/> 31-40 <input type="checkbox"/> 41-50 <input type="checkbox"/> 51-60 <input type="checkbox"/> 61-70 <input type="checkbox"/> 71-80 <input type="checkbox"/> 81-90 <input type="checkbox"/> 90+
Acreage					
Stand history					

Field	Explanation/Options
Stand establishment	Was the stand established by planting? Yes, No, or Unknown
Stand regeneration	How will the stand be regenerated post-harvest? Planted with same or different species, Planted with unknown species, Naturally regenerated, Unknown
Stand stocking	Describe the stand's stocking preharvest: Understocked, Fully Stocked, Overstocked
Estimated tons to Enviva	Estimate of the tons Enviva will receive from each stand
Forest cover type	Cover type of the stand: Bottomland Hardwood, Mixed Pine & Hardwood, Other Hardwood, Pine Forest, or Pine with Hardwood Understory
Harvest type	Method of extraction: Arboriculture/salvage, Clearcut, Preharvest, Seed Tree cut, Selection Cut, Thinning
Age class	10-year range estimate of forest age (choose overstory age class in case of uneven age management)
Acreage	Approximated acreage of the stand to be harvested
Stand History	An explanation of historical use of the stand. Example: "Harvested in 1950, thinned in 1965"

DEFINITIONS OF FIELDS ON OUR QUESTIONNAIRE

Case study – Russia (sustainable harvesting criteria)

Background questions

1.	Please indicate which region/location is looked at.
	<p>Answer: Russia.</p> <p>Wood chips and briquettes for export mainly originate from regions around the borders with the EU member states, namely the Republic of Karelia, and the regions of Leningrad and Pskov. Wood pellets for export are made throughout the whole country.</p>
2.	Please indicate in 1-2 sentences why this region is of interest for this specific case study.
	<p>Answer:</p> <p>Today, Russia is one of the important suppliers of biomass to the EU, it is also one of the countries which still has plenty growth potential to deliver biomass. Russia has 22% of the world's forest area (the most in the world) and its forest and wood sector are in a transition towards market economy for nearly 30 years now.</p>
3.	Please indicate if there are specific boundary conditions you want to mention.
	<p>Answer:</p> <p>The RED II investigation has in mind suppliers of primary woody biomass. Primary biomass is currently being delivered to the EU in the form of <u>wood chips</u>. This report focusses on a possible importer of Russian biomass. In first instance, wood chips are considered, but in terms of checking the requirements, there are no significant differences with checking the import of wood pellets and wood briquettes.</p> <p>Today, practically no primary wood is used in the wood pellet business. However, this is slowly changing. Biomass producers have started considering forest residues and wood from maintenance operations for biomass production.</p> <p>For wood briquettes the same kind of feedstock is used as wood pellets. Russian briquettes, however, are more often imported to the EU without an FSC, PEFC, SBP or other sustainability certificate. Considering the nomenclature of export categories of “wood fuel”, this category includes: wood chips, wood pellets, wood briquettes, as also charcoal and firewood.</p> <p>There is also a potential for agricultural biomass products as well.</p>

Legality of harvest operations at forest sourcing area level

4.i	<p>Is the economic operator a first placer of harvested timber or timber products on the EU market (from inside or outside the EU)? <i>If no, go to question 4.iv.</i></p>
	<p>Answer: No</p> <p>Primary biomass from Russia is currently being delivered to the EU in the form of wood chips.</p> <p>The biomass producer is normally not the importer to the EU, but could be. Normally traders import the biomass to the EU. This are Russian companies or companies registered in the EU or elsewhere. Traders can be registered in tax havens in, or outside the EU, what can result in a higher legality risk.</p> <p><u>The supply contract</u> (and sometimes the <u>delivery notes/ CMRs</u>) state the incoterms of the imports to the EU. On basis of the incoterms can be determined which entity is the first placer on the EU market.</p> <p><u>Official customs declarations.</u> Companies need to officially get approved, imports and exports. This is documented. Government agencies obtain and process the information on imported products to the EU. EUTR inspectors normally use lists of imported wood products per company. The biomass needs to be classified correctly in terms of qualities, species and quantities.</p> <p>To file an <u>export declaration</u> in Russia, the biomass exporter needs to have several documents (see annex 4).</p> <p><u>Receipts that prove the payment of custom fees.</u></p> <p>Till date, Russia does not charge any export duties on woody biomass.</p> <p>Analyses indicate that the customs are well and strongly regulated in Russia. Although it is hardly possible to export non-declared wood material, in practice there is a risk the formal process of submitting documents to obtain the export permit is not fulfilled fully according the legal requirements. The full list of needed documents to export wood is extensive (Annex 4) and includes for example an official phytosanitary inspection. The Corruption Perception Index of Transparency International states a score of under 30 points for Russia, what is seen as an indication that government documents cannot be regarded as accurate all the time.</p> <p><u>Valid CITES license.</u> There are 4 tree species in Russia that are listed by CITES, these however grow in Asia and the chance they are present in biomass is negligible.</p> <p>Next to CITES, there are tree species protected by the Russian red list of flora. This could be relevant for biomass exports to the EU. It is, however, difficult to find out whether the declared tree species include all the tree species used.</p>
4.ii	<p>The operator has its own due diligence system in place to ensure that forest biomass was legally harvested as defined in the EU Timber Regulation ((EU) 995/2010)?</p>
	<p>Answer: No</p> <p>If the Biomass Producer (and possibly biomass trader) subtracts the biomass from its own concessions, it will not have an DDS on its own wood supply.</p> <p>In practice, very little biomass producers have a DDS. It is not required by law in Russia.</p> <p>Biomass Producers and traders that do not have own wood supply, or only partly, could in principle develop their own DDS. A DDS should include a risk assessment on legality. As a part of the DDS, there is an option to order a “legal source” risk assessment by a third party (for example, for Russia, NEPcon is specialized in this), which will produce a report on legality of the wood supply.</p> <p>This “legal source” investigation is however very seldom ordered by biomass producers and traders. Link to the website of NEPcon on “legal source” https://www.nepcon.org/certification/legalsource</p> <p>Considering the EUTR, the biomass producer or trader must confirm that the organization responsible for forest management and wood harvesting has:</p> <ul style="list-style-type: none"> • A forest lease agreement; or a forest stands sale agreement (when the forest is not taken in concession)

- A Project Forest Development (PFD) that has passed state or municipal expertise (in case there is not forest lease agreement this is not needed, then the operations have to be in line with the state FMU Reglament)
- Forest declarations (and payments);
- Technological maps for the harvest sites;
- Waybill confirming transportation of harvested timber from the harvest site to log yard

Additionally, the following documents could be gathered:

- State registrations as a legal entity, and at the Tax Office; Can be verified at <https://egrul.nalog.ru/index.html>
- Evidence of payment for required insurance fees, social security funds, the national medical insurance fund and retirement fund. Can be partly verified at <https://service.nalog.ru/zd.do>
- Evidence of payment the forest concession fee. Can be verified at http://rosleshoz.gov.ru/activity/economy_and_finance/stat

Biomass Producers or traders produce/obtain one or more of the following documents:

- Shipping specification
- Bill of lading or bill of lading
- Railway bill
- International consignment note (CMR)
- Consignment
- Phytosanitary certificate
- Agreements (contracts) for the supply of forest products, including with intermediaries
- Customs declarations (if relevant)

Risk assessment on legality. Biomass traders placing biomass on the EU market should have a DDS including a risk assessment on wood legality per supplier (according to the EUTR). They usually do not. However, when asked for the proof on compliance with the EUTR, the traders often get a few weeks' time to collect data and legal documents and hand in a dossier.

Biomass Producers and their suppliers can be asked to submit a complete list (company names and legal addresses) of their suppliers and subcontractors. They sometimes are also requested to specify all relevant storage places of raw material and biomass in the supply chain and indicate whether there are risks related to mixing up wood from other sources (and intended for other purposes or clients). Suppliers can be asked to report on the risk related to the actual origin and legality of the wood, and the chance of non-eligible participants or inputs in the supply chain.

The risk assessment would do well to include a report on a stakeholder consultation on the legality of the concession rights, compliance to responsibilities towards the local population and indigenous people, compliance with conserving environmental values, such as intact forest landscapes, virgin forests, and other HCVMs. However, this is not legally required in Russia. They have to follow the PFD. It states officially protected areas, where operations can be forbidden to harvest, or e.g. have the right to perform a selective felling only.

Compliance with the aspects concerning the rights of indigenous people, is a weak point (see Annex 3).

The rules for wood circulation in Russia have been significantly tightened. According to the Federal Law dated December 28, 2013 No. 415-Ф3 "On Amendments to the Forest Code of the Russian Federation and the Code of Administrative Offenses of the Russian Federation", timber turnover is subject to mandatory control in a unified state accounting system. The Unified State Automated Information System (EGAIS) accounts transactions with volumes of wood (<https://lesegais.ru/portal/>).

The data are partly publicly accessible, the system provides information on transactions in roundwood and several other wood products, but information there is sometimes still incomplete. It is regulated by the "Order of the Ministry of Natural Resources and Ecology of the Russian Federation dated April 12, 2016 N

	<p>233 On Approving the Administrative Regulation for the Execution of the State Function for the Implementation of the Federal State Forestry Supervision (Forest Protection)".</p> <p>Legal entities that have concluded a transaction with wood products are required to submit a declaration to the operator of the unified state automated information system in the form of an electronic document signed with an electronic signature.</p> <p>The declaration must include information on wood ownership, legal parties involved in the transaction, information on the volume of wood, on its tree species and assortment composition, information on the legal basis (documents) on which the timber was harvested, information on the contract under which the timber transferred, and also information about places of storage.</p> <p>Biomass producers and traders, just like any trading company in Russia have to register in front every truck load in a government system. The system records the delivery route and what is being transported.</p>
4.iii	<p>The operator is assisted by a recognized monitoring organization to ensure that forest biomass was legally harvested as defined in the EU Timber Regulation ((EU) 995/2010)?</p>
	<p>Answer: No</p> <p>There are no Russian EUTR recognized monitoring organizations, but there are registered monitoring organizations with a department in Russia.</p> <ul style="list-style-type: none"> • https://ec.europa.eu/environment/forests/timber_regulation.htm • https://ec.europa.eu/environment/forests/pdf/List%20of%20recognised%20MOs%20for%20web%20updated%2028NOV19.pdf <p>In practice, these recognized organizations are nearly never involved in monitoring the legality of the biomass imports.</p> <p>Most biomass traders start investing the legality of the biomass from Russia only after they have been contacted by an EUTR inspector, or after they have obtained questions from an interested (industrial) customer. Traders consider FSC or PEFC certification sufficient risk mitigation (without performing due diligence), however, most traders also partly import uncertified wood (be it in the form of chips, pellets, and/or firewood). Some EU Member States seldom inspect biomass coming from Russia, one of the reasons inspectors mention, is that there is practically no risk that CITES tree species are present in the biomass (common tree species are used).</p>
4.iv	<p>Traders keep records of their suppliers and customers according to Article 5 of the EU Timber Regulation ((EU) 995/2010)?</p>
	<p>Answer: Yes</p> <p>Specifically which company has supplied the woody biomass and to which company the woody biomass has been sold, can be found in the records of a biomass producer.</p> <p>By law most documents, such as contracts and primary accounting documents, accounting registers, accounting (financial) statements, and audit reports must be stored no less than 5 years after the contract, or reporting year were closed.</p> <p>This concerns direct suppliers and direct customers of the biomass producer. As stated in 4ii, information on the whole chain of custody is seldom gathered in a structural way. Information on how the suppliers of the suppliers obtained the wood is seldom gathered and stored. Because the forest fund is state owned, the supplier of the supplier is often the state, selling wood on stem.</p>

Can you identify in the case study region, if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Own Due Diligence System (DDS)	No	Restricted	-

Due Diligence System (DDS) via a recognized monitoring organization.	No (nearly never)	Restricted / Paid (n/a)	-
Records kept by traders.	No (only records on procurement)	Restricted*	-

Forest regeneration after harvest

5.i	<p>Does the forest biomass result from final felling or an intermediate felling or clearing of forest area after natural disturbances? <i>If not, forest biomass results from a precommercial thinning or pruning of standing trees. Go to question 6.</i></p>
	<p>Answer: Very seldom, but this possibility is considered here</p> <p>Commercial final fellings, such as clear cuts and selective fellings do not occur with the goal to produce biomass. There are no energy plantations in Russia. After final fellings, low grade wood in the form of harvesting residues, could, however, be chipped and sold as biomass.</p> <p>In case forest areas are cleaned after natural disturbances or with the goal of “forest reconstruction” the percentage of low-grade wood in the form of harvesting residues used for biomass production will be substantially higher and can be the main output of the operations.</p> <p>There should be the official “<u>Forest Pathology Inspection Act</u>”, this document alone is, however, too little proof, because there are still many cases of fraud regarding this Act.</p> <p>There is a risk that harvesting companies in cooperation with government officials too easily label forests as damaged or of undesirable quality, and thus fit for salvage operations. This risk is still significant. Arguably, this situation is slowly improving.</p> <p>Very seldom there are Biomass Producers in Russia (only a few), which are focussing on forest reconstruction activities as a source of biomass. In some regions, forests are dying or dominated by tree species without economical value. In forest reconstruction agreements the price for wood on stem is lower.</p>
5.ii	<p>Do supplier contracts require that forest area regeneration is carried out before or after final felling or harvest, either through natural regeneration, planting and seeding, or coppice regrowth and that forest regeneration is done in a manner that ensures quantity and quality of next generation forest resources? <i>If yes, go to question 6.</i></p>
	<p>Answer: Very seldom</p> <p>Biomass producers and traders normally do not specify this in their contracts with suppliers.</p> <p>At the state level, laws, rules and norms for reforestation are defined. The main ones are the Forest Code of the Russian Federation and the Order of the Ministry of natural resources and ecology of the Russian Federation of March 25, 2019 N 188 on approval of the rules of reforestation, the composition of the reforestation project, the procedure for developing the reforestation project and making changes to it.</p> <p>Without a valid <u>Forest Concession Contract</u> no PFD will be issued. Each lessee must have a valid <u>Forest Concession Contract</u> (Forest code Article 72) and a PFD (Forest Code Article 88);</p> <p>If the forest manager does not ensure reforestation as per PFD (the plan), the government officials will cancel the <u>Forest Concession Contract</u>. A valid <u>Forest Concession Contract</u>, by default means that the biomass producer harvests and plants trees according to PFD. Problems are, however, that the reforestation operations are often not planned where they are needed most, and, most importantly, that after the reforestation operations there are no requirements on maintenance of the stands, the seedlings are not taken care of and often perish. Considering the division of the responsibilities in Russian forestry, the second part of the criterion is not met: “forest regeneration is done in a manner that ensures quantity and quality of next generation forest resources”.</p> <p><u>Administrative offences</u> on the reforestation requirements can serve as documented proof of poor implementation of the requirements. Too many administrative offences result in the termination of the <u>Forest Concession Contract</u>.</p>

However, the problem is that currently compliance with the present laws and regulations (and PFD) do not guarantee that “forest regeneration is done in a manner that ensures quantity and quality of next generation forest resources”. The Russian forestry system is still based on outdated norms and methods that do not guarantee the regeneration of forest stands after harvesting. Next to forest certification, there are case-studies and pilot projects in which these problems are solved. Legal documents and norms are under development, but till date these new methods on so called “intensive forest management” are not obligatory nation-wide.

The regular PFD is too little evidence that the biomass producer complies with the second part of this criterion, but in combination with the following additional and voluntary “intensive forest management” requirements, the evidence could be considered sufficient:

- PFD on basis of the advanced “intensive forestry management” principles. At present, legislation provides this option for the forest regions of Karelia (covered by 2 forest regions), Dvinsk, Baltiysk-Belozersk, Sredniy Angarsk, and Baikal Gorniy (but this is not yet a legal requirement).
- PFD on basis of an advanced forest management planning investigation on basis of long-term scenarios of forest development and the principles of “intensive forestry management” (At present these are made by the Green Forest Foundation and non-public).

Biomass Producers and/or their suppliers that have voluntarily developed a harvesting and regeneration plan on basis of the advanced model specifications, can deliver this as proof of compliance with this criterion.

Every month (no later than the 10th day of each month) the concession holder has to submit a report in form 1-IL (forest use) (Order N 451 of August 21, 2017) to prove that logging is carried out in accordance with the previously submitted forest declaration.

On a quarterly basis (no later than the 10th day of the month following the reporting period), the lessee has to submit a report on the protection of forests from fires to the forestry in the form 1-OL (forest protection) (appendix 2 of Order No. 78 of March 9, 2017).

On a quarterly basis (no later than the 10th day of the month following the reporting period), the lessee must submit to the State FMU a report in the form 1-3Л (forest protection) (appendix 6 of Order N 78 of March 9, 2017).

On a quarterly basis (no later than the 10th day of the month following the reporting period), the lessee has to submit a report in form 1-VL (reproduction and afforestation of forests) (Order N 452 of August 21, 2017).

State forestry officers conduct inspections of the cutting areas (appendix 6 of the Order N 367 of June 27, 2016) to verify compliance with the terms of: the lease agreement for a forest plot; the right to use the concession; sale agreements for forest stands; the PFD; the forest declaration; technological logging maps; and legislation regarding the completion of logging operations. After the inspection, the Logging Site Inspection Act is compiled (appendix 3 of the Order N 367 of June 27, 2016).

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Type of forest operation from which forest biomass results (final felling, thinning).	Yes	Public Restricted	State FMU Reglament (FM plan) Forest Concession Contract and PFD of the lessee*
Securing of forest regeneration is done in a manner that ensures quality and quantity of next generation forest resources (e.g. assessment of abiotic and biotic natural hazards influencing tree species provenances, tree species mixtures etc.).	No	Restricted Restricted	Forest Concession Contract. Project Forest Development (PFD) (regular one) PFD (on basis of the "Intensive forestry management principles")** Inspection reports of forest plots after harvesting and regenerating activities (Logging Site Inspection Act)***

* The Forest Declarations (in combination with possibly a Forest Pathology Inspection Act) indicate the forest harvesting type, but not the reforestation method.

Online a public summary can be found on the Forest Declarations, but it indicates only the kwartal (forest area identification squares of 1 by 1 km, usually) and planned volume of harvested timber. There is also a very short online summary on the Forest Concession Contract (EGAIS).

** An advanced model of forest harvesting and regeneration can already be implemented in the forest regions of Karelia (covered by 2 forest regions), Dvinsk, Baltiysk-Belozersk, Sredniy Angarsk, and Baikal Gorniy. In the future the needed specifications will become available for all forest regions and the sophisticated modelling option will become obligatory. At present this is done only by a few leaders in the industry.

The following legislation provides this option for the above mentioned regions:

- Order of the Ministry of Natural Resources of 22.11.2017 No.626 «On the approval of the rules for forest maintenance» (revision of 01.11.2018)
<https://rulaws.ru/acts/Prikaz-Minprirody-Rossii-ot-22.11.2017-N-626/>
- Order of the Ministry of Natural Resources and Ecology of the Russian Federation of March 25, 2019 N 188 on the approval of the Rules of reforestation, the composition of the reforestation project, the procedure for developing a reforestation project and amending it (as amended on August 14, 2019)
<http://docs.cntd.ru/document/554151577/>

This result of improved planning through advanced modelling can also be achieved by a voluntary forest management planning investigation on basis of long-term scenarios of forest development (non-public, by the Green Forest Foundation <http://www.green-forest.org/links.html>), which can be used as the basis of official PFD. These two options are similar, the same people are developing them. Such an advanced version of the PFD could be used as proof of compliance.

*** Companies do reforestation operations, but selecting which areas need artificial reforestation is often done poorly, and the main problem is the follow-up, during the next years and decades the young samplings are not taken care of. This is a structural problem in Russian forestry.

Protected areas

6.i	Does the forest sourcing area include areas designated by international or national law of the relevant competent authority for nature protection purposes, including wetlands and peatlands , as
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	<p>protected? <i>If no, go to question 7.</i></p>
	<p>Answer: Yes</p> <p>Considering the officially listed protected areas (which can be found online in the Regional Forest Plan and the State FMU Reglement, as also on the website of WWF) and areas of environmental importance which were officially set aside during the Forest Inventory, the risk is low that these are incorrectly indicated in the PFD. The PFD, together with the Forest Declaration (harvest notification) are in general sufficient safeguards that the areas, which were categorized as protected areas by the government were actually found. There is, however, a risk that selective or sanitary clear cuts are done anyway in protected forests, based on incorrect Forest Pathology Inspection Acts.</p> <p>Checking the areas harvested on basis of Forest Pathology Inspection Acts could sometimes clarify this. However, often it is impossible to conclude the necessity of a sanitary felling by checking areas which have already been harvested and by observing the stumps that have been clear cut. If a concession holder often sources timber from sanitary harvests, it is suspicious, and in that case one (the biomass producer or an inspector) could visit salvage harvesting sites (sanitary fellings) before or during the forest operations.</p> <p>In exceptional cases, e.g. in cases of new (large) protection areas human error can occur. By comparing harvesting maps with the data in the public FMU Reglament and internet sources such as http://www.hcvf.ru/, these mistakes can be found. This is also being done by organisations like Greenpeace, and the chance a mistake is found and reported is high.</p> <p>There are no areas <u>designated</u> by international law (in the sense of, for example, Natura 2000, where the European Commission can make decisions on areas in certain member states). However, Russia has approved and interpreted certain international conventions. For example, in 1995, the Russian Federation approved the UN Convention on Biological Diversity, taking on a number of obligations, including the development and implementation of strategies, programs and legislative acts on the conservation of biological diversity. The Russian Federation has ratified the Convention on Biodiversity and reached its national target, which are covering 13,5% of its territory by a system of protected areas. By 2017, it was 13,6%.</p> <p>On basis of national law, all areas that already have an official status as a protected area are reflected in the state forest inventory, on basis of which forest management is based. Certain wetlands and sometimes peatlands can be set aside as a protection area.</p> <p>There are different kinds of protected areas, from closed national nature reserves, to areas appointed by regional authorities. At areas that are officially designated as a protected area or low-intensity forest operations are allowed, or none at all (by law).</p> <p>Next to these officially outlined protected areas, also during the Forest Inventory (smaller) areas are put aside, on basis of forest inventory rules. The State Forest Inventory report accumulates this information (indicating the large and small protected areas) and is a mandatory basis for development of subsequent documents related to forest management. For example:</p> <p><u>The Forest Inventory</u> data are taken into account to produce <u>Regional Forest Management Plans</u>, which are used to make <u>State FMU Reglements</u>, which are the basis for PFDs (the concession holder's harvesting and regeneration plan). There are official forest management requirements to the different kinds of protected areas stated in the Forest Inventory.</p> <p>The answer to this criterion is YES, because such areas are stated per concession.</p> <p>However:</p> <ul style="list-style-type: none"> • This does not confirm that a sufficient amount of areas (considering e.g. international conventions) are categorised as protected. Specialists state that too little (large) areas are officially designated as protected areas; and that in practise the Forest Inventory inspectors have too little time and resources to find the (small) areas of ecological importance. The data of the Forest Inventory is often out-dated and poor. • Although on paper restrictions are implemented, and several areas obtain a protected or an environmental status, the implementation of protecting HCVFs, is insufficient. • The areas that are protected on paper, are sometimes harvested anyway, for example, on basis of incorrect sanitary clear-cut declarations in riparian zones, and insufficient law enforcement. Based on a Forest Pathology Inspection Act a Forest declaration can be issues. The declaration then states the forest plot should be "sanitary clear cut".

	<p>WWF has an extensive and detailed online map on HCVF in Russia that can be used as proof on compliance (http://www.hcvf.ru/) on preserving HCVPs. This map indicates much more HCVP than the ones set aside in the State Forest Inventory. These maps can be used to prepare a PFD and to determine if a concession holder has destroyed HCVPs (this is mainly of importance for the next criterion).</p>
6.ii	<p>Do supplier contracts contain the provision of conditions statements from the relevant competent authority?</p> <p>Answer: NO</p> <p>The Biomass Producer, for example, buying wood from a harvesting company, or from a saw mill, normally does not demand any additional conditions statements from the supplier. They use simple procurement contracts. It is not uncommon that the wood is offered for free without a contract also, because the saw mills have to get rid of processing residues, such as slab wood, in a legal way.</p> <p>The PFD of the forest concession holder, together with the Forest Declarations (harvesting notifications), however, do “contain the provision of conditions statements from the relevant competent authority” on wood harvesting in and outside protected areas. It is illegal to not comply with these conditions and the execution of the conditions is checked by government forest inspectors.</p> <p>The State FMU Reglament is a forest plan, which is public. The PFD, which is based on the Reglament, is, however, not publicly available. These documents state the kind of forest management operations intended per plot and the amount of to-be-harvested cubic meters. The State FMU Reglement also states the protected areas.</p> <p>A summary on the issued forest declarations are (should be) publicly available through the online system EGAIS. The online system does not give information on the kind of forest harvesting operation (e.g. a maintenance cut, final cut or a sanitary felling).</p> <p>Although much information is publicly available (State FMU Reglament and a summary on the Forest Declarations), to obtain (and check) “the conditions statements from the relevant competent authorities” on the forest operations more information is needed. One could ask for the Forest Concession Contract and the PFD, as also the Forest declarations and the relevant Forest Pathology Inspection Acts.</p> <p>Considering supply of biomass upstream, supply contracts can state how a legal obligation will be met (but not a list of condition statements from the relevant competent authority).</p> <p>Large, industrial customers of Russian biomass in the EU sometimes <u>have a list of additional requirements</u> on environmental and social aspects and agree on additional safeguards that these aspects are met. Till date, traders do not have their own (standardised) DDS forms to record company visits and risk assessments.</p>
6.iii	<p>Do supplier contracts contain the required implementation evidence of the measures specified in the conditions statement?</p> <p>Answer: NO</p> <p>The Biomass Producer, for example, buying wood from a harvesting company, can find online certain relevant documents on the conditions statements. The State FMU Reglament and a short summary on the Forest Declarations of the concession holder are publicly available. It would be very time consuming, but in principle a Biomass Producer could check if the wood supplier is working in the forest sections (kwartals, squares of normally 1 by 1 km), which are indicated as exploitable in the State FMU Reglament. But the online summary on forest declarations has insufficient information to go into the precise detail of the operations per plot per kwartal.</p> <p>Information on certain major issues with concession holders are stated by the State Forestry Agency online: http://rosleshoz.gov.ru/activity/economy_and_finance/stat. But information on the amount of fines a concession holder obtained, related to the fulfilment of the conditions related to forestry operations stated in the PFD and Forest Declarations is not available online.</p> <p>The documents a Biomass Producer can find publicly is insufficient evidence on the required implementation of the measures specified in the conditions statements. Moreover, the Biomass Producer should be able to investigate possible fraud in, for example, Forest Pathology Inspection Acts. In practice, biomass producers do not study the public information, nor demand additional evidence contractually. Therefore, the answer here is NO.</p> <p>A Biomass Producer could additionally require in its supplier contracts that the supplier delivers copies the Forest Concession Contract and the PFD, as also a full list of changes to the PFD related to areas with a certain protected status and the Reports on Forest Use. This would include sanitary fellings on</p>

	<p>basis of Forest Pathology Inspection Acts. One could also demand a full list of fines the concession holder obtained on forest operations, but it is impossible to check if they sent the whole list.</p> <p>The implementation of the agreed upon forest harvesting plan and measures to conserve protected areas are indeed checked by government inspectors (the government is the owner of the forest fund). The requirements have legal force and (by law) non-compliances to the agreements are fined or brought to justice. There is a system in place in which fines are officially issued and law suits are held. However, the system has very limited (too little) capacity on determining HCVF (which should become protected areas) and law-enforcement.</p> <p>Biomass traders and customers that are currently interested in complying with the minimal EUTR requirements, also do not gather on a structural basis concrete “implementation evidence of the measures specified in the conditions statement”, for example in forest management in protected areas. They assess risks, do random checks, and require the suppliers to have a general package of legal evidence “readily available”.</p> <p>To comply with legal aspects the following order is of main importance: Order N 69 of the Forestry Agency of February 29, 2012: “Composition of the Forest Development Project and the procedure for its development”. Relevant documents are the general Red Lists of protected species of Russia, and the Red Lists of protected species per Subject of the Russian Federation (region). These red lists are also useful to investigate legal compliance onsite.</p>
6.iv	<p>If forest operations are restricted in the nature protection areas, do suppliers contracts require the provision of biomass removal in the protected area obtained from the relevant competent authority (including wetlands and peatlands)?</p>
	<p>Answer: No</p> <p>If the area is officially protected, it is often not possible to do final harvesting operations there, only e.g. sanitary cuts. If there is no official protection status – timber is harvested as usual.</p> <p>The nature protection areas the government found and mapped, forestry often is not permitted (and thus is biomass removal also not permitted), or low-impact forestry operations are allowed only. This information can be found in the public State FMU Reglment, on basis of which the PFD are based. With “biomass” could be understood low-grade forest residues that could be sold as wood chips.</p> <p>The PFD and Forest Declaration describe which forest harvesting methods should be used, forest regulations regulate if (and which) low-grade forest residues are allowed to be left in the forest, and which have to be harvested and removed.</p> <p>It happens that for feasibility reasons certain trees are left in the forest, which should have been harvested and wood logs are left along the forest roads. Such results are considered juridical offences and are fined or prosecuted.</p> <p>The removal of peat is considered under a different economic activity, not related to forestry and it is not considered within PFDs (thus forbidden).</p>

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region? (yes/ no/ not reviewed)	Ease of access (public, paid, restricted)	Link to source or reference to Annex ¹⁰³
Condition statements from statutory bodies regarding protected areas including stipulated measures and prohibitions in the protected areas, including wetlands and peatlands	Yes	Public	State FMU Reglament
Evidence of implementation of plans/measures in nature protection areas	Yes	Restricted	Forest declarations (Special attention for sanitary fellings and thus the Forest Pathology Inspection Act)* Inspection reports of forest plots after harvesting and regenerating activities (Logging Site Inspection Act)
*Precautionary approach is recommended – biomass produced through sanitary fellings should be avoided, or such sites should be inspected prior to harvesting.			
Permissions for biomass removal in protected areas including wetlands and peatlands.	Yes (often it is possible to harvest in these areas)	Restricted	Forest declarations Special attention for sanitary fellings and thus the Forest Pathology Inspection Act

¹⁰³ Only for relevant source or type of evidence. No need to provide for all

Maintenance of soil quality and biodiversity with the aim of minimizing negative impacts

7.i	<p>Do poor or vulnerable soils exist in the forest sourcing area? <i>If no, go to question 8.i.</i></p>
	<p>Answer: YES</p> <p>Often vulnerable and swampy soils are present, seldom poor soils (in the sense of limited availability of nutrients).</p> <p>In the past the PFD indicated winter and summer harvesting areas, but not anymore. Moreover, the PFD, which takes into account the State FMU Reglament (and which is based on the Regional Forest Management Plan and State Forest Inventory), is generally based on outdated raw data.</p> <p>A draft Government Decision has been developed, it provides measures for the conservation of forest soils (section III, paragraphs 13-14).</p> <p>Draft Decree of the Government of the Russian Federation "On approval of measures to preserve forest plantations, forest soils, the habitat of wildlife, and other natural objects in forests" (prepared on 08.24.2018). https://www.garant.ru/products/ipo/prime/doc/56669938/</p> <p>This draft Decree will improve the management of vulnerable and poor forest soils.</p>
7.ii	<p>Do supplier contracts require harvesting permission of the relevant competent authority in sensitive areas in the forest sourcing area (e.g. poor vulnerable or sensitive soils) and confirmation of appropriate precautionary measures and harvesting procedures in these areas? <i>If no, go to question 8.ii.</i></p>
	<p>Answer: No (see also 6ii and 4ii)</p> <p>The Biomass Producer, for example, buying wood from a harvesting company, or from a saw mill, normally does not demand any additional conditions statements from the supplier.</p> <p>The PFD of the forest concession holder, together with the Forest Declarations (harvesting notifications) in combination to the legal framework in forestry "contain the provision of conditions statements from the relevant competent authority". The forests are all state owned and the system of forestry laws and regulations applies to the whole forest fund.</p> <p>Timber harvesting rules: paragraph 12 l) – When harvesting wood, the destruction of the upper fertile soil layer outside the dragging and loading areas is not allowed.</p> <p>The approach in practice is:</p> <ul style="list-style-type: none"> • Excluding of most sensitive sites (wet) from exploitable area (State Forest Inventory / Regional forest management plan) • Harvesting timber at sensitive soils in winter time (when snow covers the soil) • Strengthening of the skidding trails with branches, tops of the trees and other wood residues <p>Supplier contracts upstream (wood chip and pellet producers, and traders) do not demand proof on this point. Sometimes (in the best case) procurement contracts demand to keep a package of proof on legality readily available in case of an EUTR inspection (see also 4ii). This would include the Forest Concession Contract, PFD, some example harvesting declarations, and some example delivery documents. Online one can check the registration of companies and their main specifics (for free).</p>
8.i	<p>Does the biomass include stumps and residues? <i>If no, go to question 9.i.</i></p>
	<p>Answer: No</p> <p>Tree stumps, are not used in Russia. Forest residues, like tree tops and branches, could be used in some cases and to some degree, but in practice they are not.</p> <p>Wood pellets are nearly always made from processing residues. Wood chips could be made from low-grade wood stems. Chipping forest residues, especially for exports would be something new (exceptional).</p> <p>In practise the forest residues are left in the forest to decay, or sometimes they are burnt. Stumps are never removed from harvest sites.</p>
8.ii	<p>Do suppliers contracts require that evidence is provided to confirm that stumps or residues have not been harvested inappropriately from poor vulnerable soils? <i>If no, go to question 9.ii.</i></p>

	<p>Answer: No (see 8i)</p> <p>The Biomass Producer, for example, buying wood from a harvesting company, or from a saw mill, normally does not demand any additional conditions statements from the supplier.</p> <p>Biomass producers are of the opinion that this is sufficiently well covered by forestry laws and regulations. The forest fund is state owned.</p> <p>After the company executes the planned forest operations, the plots can be checked (at random) by government officials and several Acts are issued on compliance (or non-compliance) with the forestry regulations. The regulations determine how the forest plot should look like after the operations have been finished, this covers aspects such as standing young trees, standing mature trees, harvested trees, and in which way forest residues are left behind. In some regions the forest operations are checked often, while in the remote areas only 5-10% of the forest operations are checked.</p>
9.i	<p>Do supplier contracts require that harvesting operations take into account biodiversity attributes to minimise the impact on native forest types, habitat features, rare and endangered species and their habitats, stipulated and recommended deadwood types and amounts?</p>
	<p>Answer: NO (see 6ii)</p> <p>Biomass Producers, which procure raw material from suppliers rely on the legal framework and law-enforcement regarding these topics and do not demand additional proof.</p> <p>The execution of the PFD and Forest Declarations is related to forestry on laws, regulations and norms that specify most of these topics. After the company executes the planned forest operations, the plots are checked at random by government officials and several Acts are issued on compliance (or non-compliance) with the forestry regulations. Biomass Producers interested in the correct execution of the legal requirements could ask for the state inspection Acts and for an overview of obtained fines.</p> <p>Considered are “native forest types” but based on poor raw data, normally. In theory habitat features, and rare and endangered species and their habitats are also important in Forest Inventory, but in practice most are not found (only easy to find ecosystems housing these features are found). The Russian approach does not have stipulated and recommended deadwood types and amounts, but prescribes to take care of standing deadwood, where it could be of danger, but nowadays allows to leave dead trees standing were they do not form an obvious risk to people.</p> <p>The State FMU Reglament (public) and the PFD (non-public) indicate areas of high biodiversity value and for example buffer zones. The size of buffer zones are defined in clause 17 of the Timber Harvesting Rules. State inspectors check is harvesting companies comply with the requirements and the planned regime for the use of such sites. In particular, they check if the delivered wood was harvested in areas where wood harvesting was prohibited, or if the wood was harvested in the indicated season (during which wood harvesting is allowed).</p> <p>Timber Harvesting Rules, paragraph 24: When allocating cutting areas for harvesting in clear cuts, the following areas are not included in the operational area of the cutting areas:</p> <ul style="list-style-type: none"> a) areas of natural sites of environmental importance; b) biodiversity objects with an area of more than 0.1 ha. <p>This clause also regulates preserving different biodiversity elements, like preserving a group of very old trees, etc.</p> <p>Next to government data, WWF maintains an up-to-date and detailed map on HCVFs, which Biomass Producers and their customers could consult to establish performance on these topics. Concession holders have precise information on where they have and will perform forest operations (PFD and Forest Declarations). With this information it is not difficult to establish if the supplier has or plans to fell HCVFs. Usual (uncertified) suppliers, however, will not comply with the much more demanding maps of WWF on conserving HCVFs.</p> <p>Some aspects, such as rare and endangered species and their habitats (which can also be protected animals) require an investigation of the plot prior to the forest operations.</p>
9.ii	<p>Do suppliers contracts require the proof that avoidable damage (e.g. to the soil and the remaining stand) due to the harvesting operations has not occurred and that negative impacts due to harvesting operations have been minimised?</p>
	<p>Answer: No see 6ii</p> <p>Biomass Producers, which procure raw material from suppliers rely on the legal framework and law-enforcement regarding these topics and do not demand additional proof.</p>

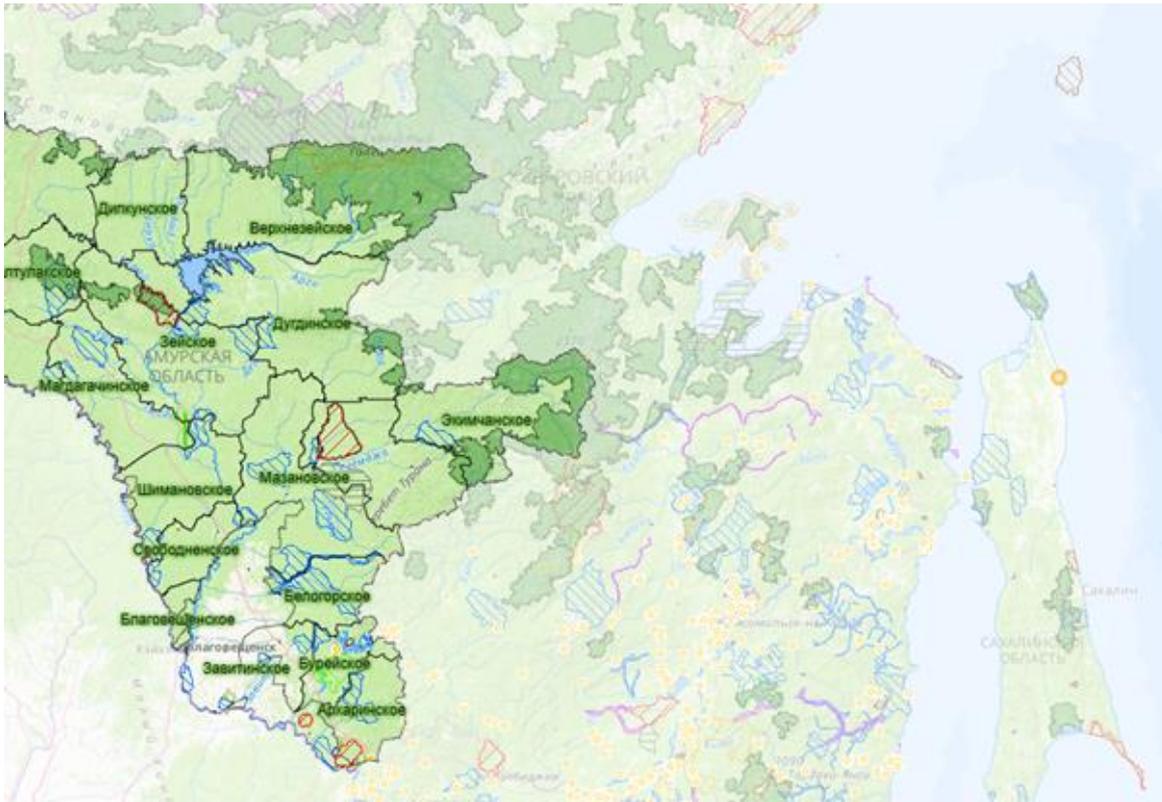
<p>The PFD of concession holders is related on laws, regulations and norms that specify these topics. Forest authorities conduct random onsite inspections of the sites where timber has been harvested in order to confirm that timber regulations were followed (including avoidable damage to the soil and the remaining stand). The inspectors issue Acts on compliance (or non-compliance).</p> <p>Biomass Producers and their customers could ask for these Acts on government inspection after forest operations (non-public) but would need to trust the supplier it delivered all Acts. The best way is to check these aspects at random oneself, or through an independent inspector. One could develop a monitoring system in which the supplier delivers photos of each harvesting plot after the forest operations.</p> <p>Forestry regulations ban certain wood harvesting operations in areas of high biodiversity value (completely, or e.g. in certain seasons), it could be checked if the available information has been used correctly to issue Forest Declarations.</p>
--

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
The existence of poor or vulnerable soils in the forest sourcing area.	Poor soils – no Vulnerable soils – yes (partly)	Public	State FMU Reglament www.hcvf.ru
Harvesting of forest biomass on poor or vulnerable soils	Yes	Restricted	
Stump or residue removal	No	Restricted	Project Forest Development (PFD)
Consideration and minimizing of negative impacts on biodiversity features	Yes	Restricted Public	Project Forest Development (PFD) www.hcvf.ru
Minimization of impacts on soil and remaining stand	Yes	Public	Act on forest operation compliance

An example of the HCVF map:



Maintenance or improvement of the long-term production capacity of the forest

10.i	<p>Does data exist on the harvested wood amounts and net annual increments as part of the forest sourcing area? <i>If no, pass the rest of the questions.</i></p>
	<p>Answer: Yes</p> <p>These data are gathered by government organisations. However, the Forest Inventory data are, usually very out-dated (poor). Also the expected results of forestry (annual increment) are too positive, as newly planted stands are not taken care of and young forests are insufficiently managed in practice (too seldom thinnings are executed).</p> <p>The annual allowable cut is calculated on the level of the state FMU and can be found in the State FMU Reglament. This “annual allowable cut” is divided (considering the different age categories of forest stands) between the concession holders within the area of the state FMU. Every forest concession holder, obtains a part of the “annual allowable cut”. This part is called the “allowed volume of forest harvesting” and used in the PFD.</p> <p>Because the annual allowable cut of the State FMU is leading, an unexpected disturbance in the area of one concession holder influences (will lower) the “allowed volume of forest harvesting” of all concession holders on the territory of the State FMU.</p> <p>Regarding the calculation of the annual allowable cut on the level of the state FMU, the planning of rotations does not correspond with reality (and the rotations are not tailored to the needs of the concession holders). This influences the accuracy of the calculated annual allowable cut negatively. However, the developments in forest legislation and planning will gradually solve this problem (see criterion 5).</p> <p>In practice maintenance and improvement of the forest production capacity is a highly neglected aspect in Russian forestry, but it is being improved currently.</p>
10.ii	<p>Do average annual harvested timber amounts NOT exceed the average net annual increment (e.g. an average measured over a 5-year period)? <i>If yes, pass the rest of the questions.</i></p>
	<p>Answer: No (specified risk of non-compliance)</p>

There is a strict government control on not exceeding the “allowed volume of forest harvesting” by concession holders. The data on harvested wood and allowable volume of forest harvesting are checked strictly and non-conformance is heavily fined.

Biomass Producers and their customers rely on this government control system. State FMU have to comply with the annual allowable cut as well.

However, the annual allowable cut, calculated for the State FMU Reglament is misleading due to practical reasons: quality of the inventory data, quality of the growth models, improper or no forest management operations, unequally distributed harvesting activities, inefficient harvesting methods, high risk of forest fires, high increment loss (decay) in forestry due to extensive forestry use (and a very poor forestry infrastructure). In Russia there is a large difference between gross and net annual increment.

In case the annual allowable cut is calculated, according to the new principles and models of “intensive forest management” (see the bullet points in criterion 5) this issue of misleading data could be considered solved. However, forest fires are and will stay an increasing problem, destroying large amounts of the annual increment.

11.i	In the forest sourcing area, do average annual harvest levels exceed the average net annual increment? Due to restructuring of even-aged woodlands? Habitat management or restoration of biodiversity? Or a response to pest, disease or storm damage?
	<p>Answer: YES</p> <p>On paper it is not a problem, but in practise it often is, see criteria 5 and 10.</p> <p>Restructuring of even-aged woodlands, is very seldom a problem regarding exceeding harvesting levels. Habitat management or restoration of biodiversity does not happen often and does not affect the harvesting level negatively. Forest fires themselves and the salvage operations after forest fires do effect the net annual increment negatively. There are often natural forest fires in Russia.</p> <p>See criterion 9 for other reasons why the annual harvest levels can be higher than the net annual increment (despite compliance with the calculated allowed volumes for forest harvesting).</p> <p>Annual allowable cut (AAC) is calculated not for certain forest concessions, but for the whole territory of State FMU. Several methods of calculation are allowed, and the final result can be a combination of the results from calculations by different methods. There is an additional restriction, stating that 'the AAC shall not be higher than the average net annual increment, when the volume of mature and overmature timber is less than 50% of the total volume of timber'.</p> <p>Another restriction states that when the forests are 'exhausted' and the share of mature and overmature forests is very small, the AAC shall ensure sustainable timber harvest levels for conifers and other valuable species for a period of at least 10 years, and for broadleaved species – 5 years.</p> <p>Overall, state authorities have very poor knowledge on actual volumes of timber available in the forests. Last forest inventory (usually desk-based) in many forests was undertaken in the 1990s, and the last time an forestry inventory engineers actually inspected the forests could be in the 1950s. This leads to overestimations (sometimes intentionally) of the available volumes of timber and correspondingly of AAC. The more timber can be harvested, the higher is the annual forest concession fee (paid by the concession holders).</p> <p>Once AAC is established for the State FMU, it is then shared between to concession holders. Sometimes this is done unproportionally, but the methods have been improved.</p>
11.ii	Do permits exist to mention or justify this in the case of exceptional higher harvest levels? <i>If yes, pass next question.</i>
	<p>Answer: YES</p> <p>Sanitary clear cuts can be issued on basis of inspection Acts. Forests of poor ecological and/or economical value can be "reconstructed".</p> <p>Please see criteria 5 and 10.</p>

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Sustainable harvest levels	No	Restricted	See criterion 5
Harvest amounts exceed net annual increments	Yes*	Restricted	See criterion 5 https://roslesinfor.ru/atlas

*high risk in many regions. In Russian there is a large difference between gross annual increment and net annual increment.

Case study – USA (LULUCF criteria)

Key findings

The case study indicates that based on currently available information and systems, compliance with the LULUCF criteria could not be demonstrated. The historic information on carbon stocks and sinks, as well as management practices would be available. But a forward-looking modelling of carbon stock and sinks would need to be added (which can be done based on existing calculators).

Criterion	Underlying steps for compliance	Yes/No
	Are the spatial boundaries of the compliance check defined for the sourcing area?	Yes
	Are the relevant carbon pools defined?	No
	Is a historical reference period defined?	Yes
	Are forest management practices used over the sourcing area described?	Yes
LULUCF criteria	Are carbon stocks and sinks quantified as part of the forest sourcing area over the historical reference period?	Yes
	Is the length of the future long-term period defined?	No
	Are the forest management practices used over the long term described to strengthen and maintain carbon stocks and sinks?	Yes
	Are the mean carbon stocks and sinks of a sourcing area estimated over the long-term using forest carbon calculators and models which consider the effects of forest growth and management practices?	No

Background questions

1.	Please indicate which region/location is looked at.
	Answer: North Carolina, USA
2.	Please indicate in 1-2 sentences why this region is of interest for this specific case study.
	Answer: North Carolina has a robust forest products market for export pellets and 58% of the state’s land area is occupied by forested areas that are available for timber production.
3.	Please indicate if there are specific boundary conditions you want to mention.
	Answer: Only the eastern half of the state has forests within the export pellet market “woodshed”.

Spatial boundaries

12.	Are the spatial boundaries of the compliance check defined for the sourcing area?
	Answer: Yes. Case study producer in North Carolina (Enviva) tracks wood suppliers to the “tract” or parcel level and as such is able to define spatial boundaries for the sourcing area.

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Geographically explicit area belonging to a single country or a region	Yes	General supply area is public, but specific tract location is confidential to Producer	See map in Annex. https://www.envivabiomass.com/wp-content/uploads/ENV-SBP-05-AHO-Supply-Base-Report-FINAL.pdf
Compliance check for a geographically explicit area having common forest management practices	Yes	Public Report	https://www.envivabiomass.com/wp-content/uploads/ENV-SBP-05-AHO-Supply-Base-Report-FINAL.pdf https://www.envivabiomass.com/sustainability/responsible-sourcing/wood-supply-map/#5/33.146/-84.930

Carbon pools

13.	Are the relevant carbon pools defined?
	Answer: No. The Producer does not track individual carbon pools but concludes overall stocks are increasing based on growth rates exceeding harvest rates within the supply area (e.g., Hamlet supply area in North Carolina). FIA data does not track belowground carbon stocks. Aboveground live and dead stocks can be monitoring using FIA data, but aboveground pools were not separated in the Producer reports. Reference values for carbon stocks can be obtained for any desirable date range based on FIA data.

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Do forest carbon pools include above and below ground biomass, litter, deadwood and soil organic carbon?	Partially	Public Data	https://apps.fs.usda.gov/Evalidator/evalidator.jsp
Do forest carbon pools exclude the Harvested Wood Product pool?	No	Not easily available from landowners or public data sources	

Historical reference

Is a historical reference period defined?

14.	Is a historical reference period defined?
	Answer: Not explicitly. Reporting by the Producer evaluates net carbon stock change based on the national forest inventory data that is reported on a rolling basis for a re-measurement period that is roughly five years. A period of 10 years could be calculated from that.

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Are average carbon stocks and sinks for the last years used as a reference period?	Yes	Public	https://apps.fs.usda.gov/Evalidator/evalidator.jsp https://sbp-cert.org/wp-content/uploads/2019/09/Supply-Base-Report-v1.3_Main-Audit_Enviva-Pellets-Hamlet-FINAL.pdf
Is a period of ten years used?	No (but data could be combined to come to the ten years period)	Public	https://apps.fs.usda.gov/Evalidator/evalidator.jsp <i>The link is a report generator. The user chooses a specific geography, date range, and response variable (e.g., aboveground carbon stocks) to generate a report.</i> https://sbp-cert.org/wp-content/uploads/2019/09/Supply-Base-Report-v1.3_Main-Audit_Enviva-Pellets-Hamlet-FINAL.pdf

Forest management practices in a sourcing area

15.	Are forest management practices used over the sourcing area described?
	Answer: Yes. They are described based on data collected by the producer. The Producer describes different forest management practices for different broad forest types. For example, the Enviva Hamlet Supply Base Report describes both even- and uneven-aged practices for hardwood stands. Where even-aged systems employ a 40-year rotation and rely on natural regeneration. Pine systems are managed on an even-aged basis with a rotation age of 25-30 years. They also note that forest management practices in the region vary greatly due to landowner demographics and forest types.

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Is historical data on harvesting and thinning intensity, harvesting levels and age class structure collected as part of historical management plans?	Yes	Internal	https://www.envivabiomass.com/sustainability/responsible-sourcing/wood-supply-map/#5/33.146/-84.930 and See Annex (harvest type, age class, but not explicitly harvest level)
Is historical data on harvesting and thinning intensity, harvesting levels and age class structure collected as part of forest inventories?	No	Internal	See Annex. Some information is collected on harvesting history, but not explicitly on historical age class structure or harvest levels.

Lastly, are the following factors included in the forest management plan?
Tick the appropriate box.

	Yes	No
Annual harvest level		X
Site index		X
Tree species composition (e.g. including basic wood density, carbon content, whole-tree biomass in relation growing stock volume)		X
Forest reproductive material used (e.g. provenance)		X
Thinning intensity and frequency		X
Cutting regime (e.g. even-aged clearcutting, shelterwood, group or tree selection, coppice)	X	
Other management decisions (e.g. fertilization, drainage, herbicide and pesticide application, etc.)		X
Average minimum and maximum rotation length		X

Quantification of carbon stocks and sinks

16.	Are carbon stocks and sinks quantified as part of the forest sourcing area over the historical reference period?
	Answer: Yes. Using national forest inventory data (FIA) described above.

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Is existing data on carbon stocks and sinks collected as part of the sourcing area over the historical reference?	Yes	Public	https://apps.fs.usda.gov/Evalidator/evaluator.jsp
Does a producer estimate mean data on carbon stocks and sinks collected as part of the sourcing area over the historical reference?	Yes	Public	FIA Data: https://apps.fs.usda.gov/Evalidator/evaluator.jsp
Does the producer apply the forest carbon calculators and models recommended?	Yes	Public	US Forest Service tools based on FIA Data: https://apps.fs.usda.gov/Evalidator/evaluator.jsp
Does the producer estimate reference values for all the relevant carbon pools by stratifying the sourcing area in homogenous units?	No (but the inventory data are stratified by forest type and could be used to estimate reference values for aboveground carbon pools, but the Producer did not report on these pools.)		Pools are not separated. See for example, page 101 in: https://sbp-cert.org/wp-content/uploads/2019/09/Supply-Base-Report-v1.3_Main-Audit_Enviva-Pellets-Hamlet-FINAL.pdf

Lastly, does the stratification process follow the indicators below?
Tick the appropriate box.

Conditions	Indicator	Yes	No
Administrative conditions	Administrative region where sourcing level is located (e.g. region, province, municipality).	X	
	Ownership type (e.g., private public)	X	
Biophysical conditions	Topography		X
	Site conditions (e.g. forest site index)		X
Forest characteristics	Tree species composition		X
	Forest management regime	X	

Future long-term period

17.	Is the length of the future long-term period defined?
	Answer: No. There is no mechanism or defined plan for checking voluntary compliance in the future (e.g., regeneration, avoiding land conversion). This could however be done, once a forward-looking modelling is added.

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Is a compliance check for a period of at least 30 years done?	No	Public report	No evidence of future planned compliance checks https://sbp-cert.org/wp-content/uploads/2019/09/Supply-Base-Report-v1.3_Main-Audit_Enviva-Pellets-Hamlet-FINAL.pdf

Forest management practices

18.	Are the forest management practices used over the long term described to strengthen and maintain carbon stocks and sinks?
	Answer: Yes. Described practices would be expected to strengthen or maintain carbon stocks.

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Do the expected forest management practices deviate from the historical practices?	No	Public Report	https://sbp-cert.org/wp-content/uploads/2019/09/Supply-Base-Report-v1.3_Main-Audit_Enviva-Pellets-Hamlet-FINAL.pdf
Is the deviation affecting the future development of carbon stocks and sinks, described in the forest management plan?	Not applicable		

Mean carbon stocks and sinks

19.	Are the mean carbon stocks and sinks of a sourcing area estimated over the long term using forest carbon calculators and models which consider the effects of forest growth and management practices?
	Answer: No. Long-term projections are not made. This is however possible to do, for example projections could be made using FIA data and accepted growth models such as the US Forest Service's Forest Vegetation Simulator. For this case/producer, this was not done.

Can you identify in the case study region if any of the following types of evidence is available to determine the status of the country based on the answers to the questions above?

Please fill in the table and when there are relevant links or examples of the evidence available, please add them in the annex (and indicate so in the column most to the right).

Possible sources of evidence	Available for this region?	Ease of access	Link to source or reference to Annex
Does the producer estimate mean carbon stocks and sinks for all the relevant carbon pools by stratifying the sourcing area in homogenous units?	No	Public report	https://sbp-cert.org/wp-content/uploads/2019/09/Supply-Base-Report-v1.3_Main-Audit_Enviva-Pellets-Hamlet-FINAL.pdf
Are the carbon pools and same forest carbon calculator or model employed for estimating carbon stocks and sinks of a reference level?	Not applicable.		

Example evidence

Question 10ii. FIA Evalidator Summary Output for North Carolina (county level data)

6/15/2020

EVALIDator Version 1.8.0.01

EVALIDator Version 1.8.0.01 - View report

Numerator attribute number and description: 0202 Average annual net growth of merchantable bole volume of growing-stock trees (at least 5 inches d.b.h.), in cubic feet, on forest land

Denominator attribute number and description: 0002 Area of forest land, in acres

This ratio estimate is based on the plot area that was forest land at both the beginning and end of the remeasurement period. This provides a more realistic ratio estimate of the actual change component (growth, removals, mortality) that has occurred on lands that remain in the forest land base.

FIADEF as the forest land definition.

State/EVAL_GRP(s):

North Carolina 372019

Page variable=None (based on values from the Current inventory).

Row variable=County code and name (based on values from the Current inventory).

Column variable=All live stocking (based on values from the Current inventory).

Filtering clause(s) applied to numerator:

Filtering clause(s) applied to numerator and denominator:

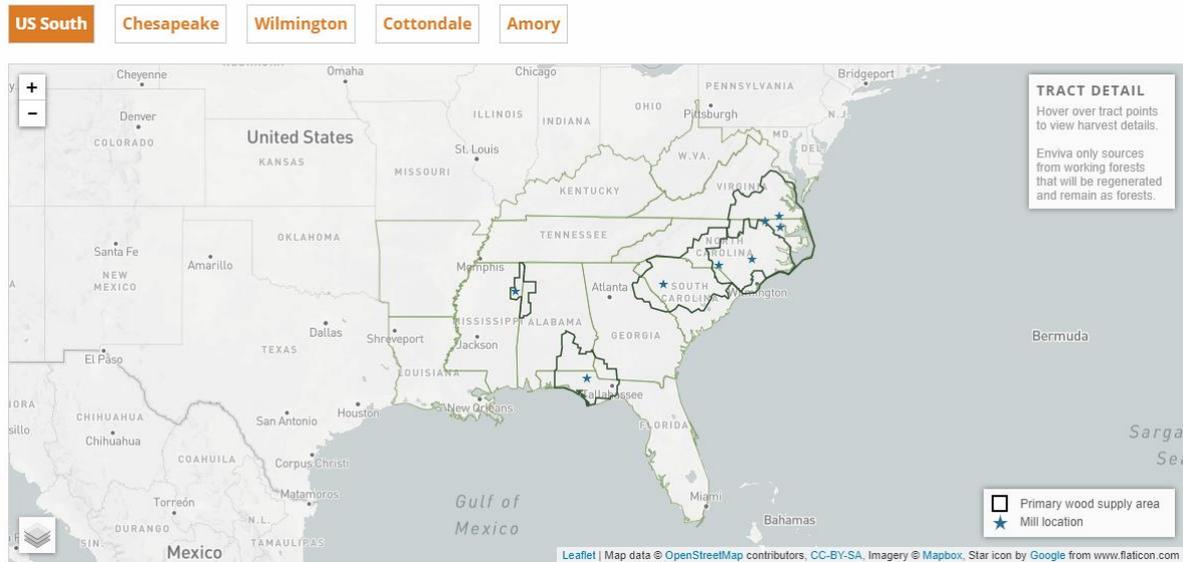
Ratio estimate:

County code and name	All live stocking					
	Total	Overstocked	Fully stocked	Medium stocked	Poorly stocked	Nonstocked
Total	84.5617	122.7906	96.3686	65.3641	36.5173	37.1019
37001 NC Alamance	75.5443	54.0499	102.0887	60.5659	18.5825	-
37003 NC Alexander	54.8614	20.3207	72.3466	45.8681	45.9427	-
37005 NC Alleghany	92.0064	-5.2519	121.3039	37.1502	-	119.7497
37007 NC Anson	128.1617	58.7749	180.2173	95.2955	93.7314	-
37009 NC Ashe	79.3176	73.4468	96.7866	70.0686	-19.3846	-
37011 NC Avery	26.4930	58.6117	12.0148	27.7280	18.4552	-
37013 NC Beaufort	108.6672	147.8957	130.9396	94.9653	46.4177	62.6432
37015 NC Bertie	129.9179	173.7100	131.0944	111.2979	21.5253	-
37017 NC Bladen	86.5839	129.9617	98.8519	65.4199	38.9734	47.5545
37019 NC Brunswick	90.3815	102.9636	121.9403	57.2005	44.0089	31.5170
37021 NC Buncombe	49.7412	67.0466	56.7161	26.6198	27.3975	-
37023 NC Burke	71.3588	79.5963	83.8384	57.4370	55.5479	-
37025 NC Cabarrus	69.6120	23.3100	102.5658	51.4188	-40.5369	99.4069
37027 NC Caldwell	68.1475	86.0435	59.3336	85.1598	48.1381	35.1590
37029 NC Camden	42.3156	-17.3146	155.9722	3.7428	42.6497	-
37031 NC Carteret	71.9609	139.1588	67.7940	65.7070	23.5014	1.6255
37033 NC Caswell	71.2571	73.1718	89.4413	35.3086	41.5991	-
37035 NC Catawba	80.2501	69.0180	80.8226	90.8172	99.5874	-
37037 NC Chatham	133.5102	144.1589	148.8466	116.3973	71.1277	-
37039 NC Cherokee	52.3448	62.5318	53.6408	49.2491	48.0164	-
37041 NC Chowan	134.0621	-	168.9250	160.0120	-18.3689	-
37043 NC Clay	32.3482	54.3861	61.5339	1.4034	41.8940	-
37045 NC Cleveland	85.2896	173.6133	94.3151	56.0643	37.2781	-

Question 12. Supply Area Map Example

Enviva wood supply map

Choose a supply area to explore harvests Enviva sourced from during the time period spanning July through December 2019. Hover over points to view harvest details. **Please note that the information and data contained on the following web page is for general information purposes only and may not be reproduced, copied, sold, excerpted or removed without prior written consent from Enviva.**



Source: <https://www.envivabiomass.com/sustainability/responsible-sourcing/wood-supply-map/#5/33.146/-84.930>

Question 15. Stand History information examples

ENVIVA TRACT SETUP SHEET

Stand-Level Information



FORM GUIDANCE	Please provide information for at least one stand. Complete stands 2-5, if information is available. Multiple stand definition: Different harvest type, forest type, or age class within the harvest area.
----------------------	---

	Stand 1	Stand 2	Stand 3	Stand 4	Stand 5
Was stand established by planting?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown				
How will stand be regenerated after harvest? <small>* As prior to harvest</small>	<input type="checkbox"/> Planted- same species* <input type="checkbox"/> Planted- different species* <input type="checkbox"/> Planted- unknown species <input type="checkbox"/> Naturally regenerated <input type="checkbox"/> Unknown	<input type="checkbox"/> Planted- same species* <input type="checkbox"/> Planted- different species* <input type="checkbox"/> Planted- unknown species <input type="checkbox"/> Naturally regenerated <input type="checkbox"/> Unknown	<input type="checkbox"/> Planted- same species* <input type="checkbox"/> Planted- different species* <input type="checkbox"/> Planted- unknown species <input type="checkbox"/> Naturally regenerated <input type="checkbox"/> Unknown	<input type="checkbox"/> Planted- same species* <input type="checkbox"/> Planted- different species* <input type="checkbox"/> Planted- unknown species <input type="checkbox"/> Naturally regenerated <input type="checkbox"/> Unknown	<input type="checkbox"/> Planted- same species* <input type="checkbox"/> Planted- different species* <input type="checkbox"/> Planted- unknown species <input type="checkbox"/> Naturally regenerated <input type="checkbox"/> Unknown
Describe this stand's stocking preharvest	<input type="checkbox"/> Understocked <input type="checkbox"/> Fully stocked <input type="checkbox"/> Overstocked	<input type="checkbox"/> Understocked <input type="checkbox"/> Fully stocked <input type="checkbox"/> Overstocked	<input type="checkbox"/> Understocked <input type="checkbox"/> Fully stocked <input type="checkbox"/> Overstocked	<input type="checkbox"/> Understocked <input type="checkbox"/> Fully stocked <input type="checkbox"/> Overstocked	<input type="checkbox"/> Understocked <input type="checkbox"/> Fully stocked <input type="checkbox"/> Overstocked
Estimated tons to Enviva					
Forest cover type	<input type="checkbox"/> Pine w/ HW understorey <input type="checkbox"/> Pine w/ NO HW understorey <input type="checkbox"/> Mixed Pine- Hardwood <input type="checkbox"/> Bottomland Hardwood <input type="checkbox"/> Other Hardwood	<input type="checkbox"/> Pine w/ HW understorey <input type="checkbox"/> Pine w/ NO HW understorey <input type="checkbox"/> Mixed Pine- Hardwood <input type="checkbox"/> Bottomland Hardwood <input type="checkbox"/> Other Hardwood	<input type="checkbox"/> Pine w/ HW understorey <input type="checkbox"/> Pine w/ NO HW understorey <input type="checkbox"/> Mixed Pine- Hardwood <input type="checkbox"/> Bottomland Hardwood <input type="checkbox"/> Other Hardwood	<input type="checkbox"/> Pine w/ HW understorey <input type="checkbox"/> Pine w/ NO HW understorey <input type="checkbox"/> Mixed Pine- Hardwood <input type="checkbox"/> Bottomland Hardwood <input type="checkbox"/> Other Hardwood	<input type="checkbox"/> Pine w/ HW understorey <input type="checkbox"/> Pine w/ NO HW understorey <input type="checkbox"/> Mixed Pine- Hardwood <input type="checkbox"/> Bottomland Hardwood <input type="checkbox"/> Other Hardwood
Harvest type	<input type="checkbox"/> Arboriculture/Salvage <input type="checkbox"/> Clearcut <input type="checkbox"/> Preharvest <input type="checkbox"/> Seed tree <input type="checkbox"/> Selection <input type="checkbox"/> Thinning	<input type="checkbox"/> Arboriculture/Salvage <input type="checkbox"/> Clearcut <input type="checkbox"/> Preharvest <input type="checkbox"/> Seed tree <input type="checkbox"/> Selection <input type="checkbox"/> Thinning	<input type="checkbox"/> Arboriculture/Salvage <input type="checkbox"/> Clearcut <input type="checkbox"/> Preharvest <input type="checkbox"/> Seed tree <input type="checkbox"/> Selection <input type="checkbox"/> Thinning	<input type="checkbox"/> Arboriculture/Salvage <input type="checkbox"/> Clearcut <input type="checkbox"/> Preharvest <input type="checkbox"/> Seed tree <input type="checkbox"/> Selection <input type="checkbox"/> Thinning	<input type="checkbox"/> Arboriculture/Salvage <input type="checkbox"/> Clearcut <input type="checkbox"/> Preharvest <input type="checkbox"/> Seed tree <input type="checkbox"/> Selection <input type="checkbox"/> Thinning
Age class	<input type="checkbox"/> 0-10 <input type="checkbox"/> 11-20 <input type="checkbox"/> 21-30 <input type="checkbox"/> 31-40 <input type="checkbox"/> 41-50 <input type="checkbox"/> 51-60 <input type="checkbox"/> 61-70 <input type="checkbox"/> 71-80 <input type="checkbox"/> 81-90 <input type="checkbox"/> 90+	<input type="checkbox"/> 0-10 <input type="checkbox"/> 11-20 <input type="checkbox"/> 21-30 <input type="checkbox"/> 31-40 <input type="checkbox"/> 41-50 <input type="checkbox"/> 51-60 <input type="checkbox"/> 61-70 <input type="checkbox"/> 71-80 <input type="checkbox"/> 81-90 <input type="checkbox"/> 90+	<input type="checkbox"/> 0-10 <input type="checkbox"/> 11-20 <input type="checkbox"/> 21-30 <input type="checkbox"/> 31-40 <input type="checkbox"/> 41-50 <input type="checkbox"/> 51-60 <input type="checkbox"/> 61-70 <input type="checkbox"/> 71-80 <input type="checkbox"/> 81-90 <input type="checkbox"/> 90+	<input type="checkbox"/> 0-10 <input type="checkbox"/> 11-20 <input type="checkbox"/> 21-30 <input type="checkbox"/> 31-40 <input type="checkbox"/> 41-50 <input type="checkbox"/> 51-60 <input type="checkbox"/> 61-70 <input type="checkbox"/> 71-80 <input type="checkbox"/> 81-90 <input type="checkbox"/> 90+	<input type="checkbox"/> 0-10 <input type="checkbox"/> 11-20 <input type="checkbox"/> 21-30 <input type="checkbox"/> 31-40 <input type="checkbox"/> 41-50 <input type="checkbox"/> 51-60 <input type="checkbox"/> 61-70 <input type="checkbox"/> 71-80 <input type="checkbox"/> 81-90 <input type="checkbox"/> 90+
Acreage					
Stand history					

Field	Explanation/Options
Stand establishment	Was the stand established by planting? Yes, No, or Unknown
Stand regeneration	How will the stand be regenerated post-harvest? Planted with same or different species, Planted with unknown species, Naturally regenerated, Unknown
Stand stocking	Describe the stand's stocking preharvest: Understocked, Fully Stocked, Overstocked
Estimated tons to Enviva	Estimate of the tons Enviva will receive from each stand
Forest cover type	Cover type of the stand: Bottomland Hardwood, Mixed Pine & Hardwood, Other Hardwood, Pine Forest, or Pine with Hardwood Understorey
Harvest type	Method of extraction: Arboriculture/salvage, Clearcut, Preharvest, Seed Tree cut, Selection Cut, Thinning
Age class	10-year range estimate of forest age (choose overstorey age class in case of uneven age management)
Acreage	Approximated acreage of the stand to be harvested
Stand History	An explanation of historical use of the stand. Example: "Harvested in 1950, thinned in 1965"

DEFINITIONS OF FIELDS ON OUR QUESTIONNAIRE

Appendix D. CASE STUDIES AGRICULTURAL BIOMASS

This annex outlines how case studies for the new agricultural sustainability criteria were selected, developed and present their results.

D.1. Selection of agricultural case studies

Selection of case studies on waste and residues

The top five Member States in order of average crop production are France, Germany, Poland, UK and Spain, followed by Denmark, as shown in Table 22. Among such countries, it is considered that Denmark, despite overall lower residue production capacity, would make up an interesting case study it has one of the highest utilisation rates of agricultural residues, including straw, in the EU. In addition, use of straw for energy production, among other agricultural residues, has been established for over 25 years in the country.

In order to offer a balanced geographical coverage among case studies, it is proposed that Spain is pursued as a case study representative of Southern Europe and a specific sub-set of agricultural systems. A case study is also justified by the average annual production capacity, as shown in **Error! Reference source not found.**, which makes the country the 5th producer in Europe. Italy was also considered an important country of production of cereals and, therefore, straw. However, its overall production capacity is significantly lower than France, Germany, Poland, UK, Spain or Denmark. It is also considered that a Southern European perspective can be offered by pursuing Spain, instead.

Table 22. Average annual production of selected crops in the EU-27 between 2002 and 2011 (1,000 tons)

Member State	Wheat	Barley	Oat	Rye	Triticale	Total
Austria	1,511	880	140	183	215	2,929
Belgium	1,794	356	30	3	44	2,225
Bulgaria	3,642	782	48	15	23	4,510
Cyprus	12	68	1	0	0	81
Czech Republic	4,126	1,988	172	167	219	6,672
Denmark	4,880	3,468	283	188	168	8,987
Estonia	268	310	81	34	15	709
Finland	769	1,837	1,176	63	0	3,845
France	36,768	10,598	741	134	1,837	50,078
Germany	23,045	11,180	970	3,176	2,415	40,786
Greece	1,704	251	105	31	7	2,091
Hungary	4,425	1,102	145	92	448	6,212
Ireland	737	1,193	133	0	0	1,326
Italy	7,308	1,128	345	10	0	8,791
Latvia	751	285	132	116	31	1,316
Lithuania	1,483	847	147	141	254	2,873
Luxembourg	79	50	9	7	22	165
Malta	0	0	0	0	0	0
Netherlands	1,218	282	10	12	17	1,539
Poland	8,909	3,485	4,966	3,534	4,184	25,078
Portugal	176	50	61	23	27	337
Romania	5,579	1,052	339	33	102	7,104
Slovakia	1,480	691	41	65	40	2,318
Slovenia	146	65	5	3	12	230
Spain	6,037	8,724	1,025	254	120	16,158
Sweden	2,215	1,515	908	138	223	5,009
UK	15,004	5,783	706	35	65	21,593
EU-27	134,068	57,968	12,220	8,455	8,395	221,105

Source: Ecofys (2013) Low ILUC potential of wastes and residues for biofuels. URL: http://www.mvak.eu/test5674213467/Ecofys_2013_low_ILUC.pdf

Table 23. Estimates for the low ILUC potential of straw (million tons – wet matter)

Member State	Sustainable potential	Straw uses (excluding energy generation, incorporation and burning)	Low ILUC potential
Denmark	3.2	1.8	1.4
France	19.6	10.9	8.7
Germany	11.6	5.6	6.0
Hungary	2.8	2.5	0.2
Italy	4.0	1.7	2.3
Netherlands	0.5	1.3	-0.8
Poland	11.2	16.7	-5.5
Romania	3.6	1.2	2.4
Spain	8.2	2.7	5.5
UK	7.4	6.3	1.1
Total	72.2	50.7	21.4

Source: Ecofys (2013) Low ILUC potential of wastes and residues for biofuels. URL: http://www.mvak.eu/test5674213467/Ecofys_2013_low_ILUC.pdf

As reported in Table 23, some Member States such as Poland reportedly use significantly more straw than the sustainability potential. In addition, Poland, unlike many other Member States, has a straw deficit¹⁰⁴. This makes Poland an interesting case study to explore, knowing the extent to which the implementation of the REDII sustainability criteria could help to mitigate such practice. Intra-EU trade usually takes place between countries with straw surpluses (Germany, France, Poland and UK) to countries with straw deficits (Netherlands, Belgium and Austria). Traded volumes are highly variable and are influenced by the weather conditions in both the importing and exporting country and the resulting impact that this has on the straw price in that year.¹⁰⁵

The Netherlands typically imports large volumes of straw from northern France, western Germany, UK and Spain. Straw is exported from Castilla y León region in Spain to Portugal, and from northern Spain to France, Belgium, Netherlands and Germany.¹⁰⁶ We are also aware of straw export from Poland to Denmark, Germany and the Netherlands, however the traded volumes are understood to be relatively low. In 2016, around 19 kt of straw was reportedly exported from Poland.¹⁰⁷

Straw can also be traded internationally. Imports of straw-based pellets from Ukraine to the EU are currently limited. However recent modelling foresees a potential increase to 2020 and beyond linked

¹⁰⁴ Ecofys (2013) Low ILUC potential of wastes and residues for biofuels. URL: http://www.mvak.eu/test5674213467/Ecofys_2013_low_ILUC.pdf

¹⁰⁵ Ecofys (2013) Low ILUC potential of wastes and residues for biofuels. URL: http://www.mvak.eu/test5674213467/Ecofys_2013_low_ILUC.pdf

¹⁰⁶ Ecofys (2013) Low ILUC potential of wastes and residues for biofuels. URL: http://www.mvak.eu/test5674213467/Ecofys_2013_low_ILUC.pdf

¹⁰⁷ Nadwyżka słomy dostępnej do wykorzystania na potrzeby energetyczne w 2016 r, Hryniewicz, M. & Grzybek, A. (2017). http://yadda.icm.edu.pl/yadda/element/bwmeta1.element.baztech-41a7efcf-a9bd-4c1b-9db9-cacacd3a57d8/c/hryniewicz_grzybek_nadwyzka_3-2017.pdf

to the implementation of the sustainability criteria for biomass for energy in the REDII.¹⁰⁸ Ukraine is therefore proposed to look at within an in-depth case study.

Brazil is currently exporting soybeans that are transformed into soy oil and biodiesel in the EU. Due to trade negotiations, it is possible that increased exports of crops and crop residues from Brazil may be established with the EU, especially in relation to imported bagasse (outside the scope of this study).¹⁰⁹ It is considered that the likeliness and magnitude of developed imports of straw-based pellets from Brazil to the EU is rather low. On this basis, Brazil is not proposed to be taken forward as an in-depth case study.

Denmark, Spain, Poland and Ukraine were selected as case studies, following discussions with the European Commission.

Table 24. Waste and residue criteria case studies¹¹⁰

Country	Rationale for the selection
Denmark	Total straw production in Denmark accounts for 5.5 Mt, of which approximately 1.5 Mt of straw/year is used for energy. Pellets made from straw have been used significantly in recent years (5% of overall national consumption), especially in the Amagervejle Unit 1 plant near to Copenhagen and for biogas production. Denmark has one of the highest utilisation rates of agricultural residues, including straw, in the EU. Use of straw for energy production, among other agricultural residues, has been established for over 25 years.
Spain	Spain is a large straw EU producer. This is mainly based on the cultivation of cereals and on permanent crops such as olive trees, given its location in Southern Europe. Straw is used at commercial scale at several dedicated power plants. ¹¹¹
Poland	Poland is a top EU producer of triticale and rye and a relevant case study to test technical input to the guidance in relation to straw harvesting in an Eastern European agricultural context. Cereal straw utilisation was considered to exceed the sustainable potential by 5 Mt /year in the Ecofys (2013) study.
Ukraine	Imports of straw-based pellets from Ukraine to the EU are currently limited. Recent modelling exercises, however, foresee a potential increase to 2020 and beyond linked to the implementation of the sustainability criteria for biomass for energy in the REDII. We also note that the Ukraine already exports significant volumes of sunflower husk briquettes / pellets for heat and power generation. These residues are generated at a processing facility rather than on the field.

¹⁰⁸ Lamers et al (2015) Global solid biomass trade for energy by 2020: an assessment of potential impact streams and supply costs to North-West Europe under different sustainability constraints. URL: <https://bioenergy.inl.gov/InternationalReports/Global%20Solid%20Biomass%20Trade%20for%20Energy%20by%202020.pdf>

¹⁰⁹ USDA (2018) EU

¹¹⁰ Camia A., Robert N., Jonsson R., Pilli R., García-Condado S., López-Lozano R., van der Velde M., Ronzon T., Gurría P., M'Barek R., Tamosiunas S., Fiore G., Araujo R., Hoepffner N., Marelli L., Giuntoli J., Biomass production, supply, uses and flows in the European Union. First results from an integrated assessment, EUR 28993 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-77237-5, doi:10.2760/539520, JRC109869. P. 15-19.

¹¹¹ <https://www.acciona-energia.com/areas-of-activity/other-technologies/biomass/>

Selection highly biodiverse forest land case studies

For the criterion on highly biodiverse forest examples, the case studies focus on analysing the option to use remote sensing/GIS for drafting guidance maps for a specific region, ‘test’ the protocol to check for compliance drafted specific to highly biodiversity forests necessary in a specific region or (possibly together with a scheme or standard) analyse possible difficulties of including the definitions of highly biodiverse forest and other wooded land as an additional land category to the existing ‘no-go’ areas.

The Consortium proposes to select the case studies on the basis of:

- i) a potential or perceived risk for biomass to be sourced from highly biodiverse areas and
- ii) their current importance or future potential in providing feedstock used in Europe.

Table 25 summarizes the identified case studies on the highly biodiverse forest criteria including its rationale for selection, as decided in collaboration with the Commission.

Table 25. Highly biodiverse forest land case studies

Country	Rationale for the selection
Brazil	<ul style="list-style-type: none"> • We have performed 1 case study in Brazil where there could be a savannah system relevant as example to test the applicability of the stepwise approach for a specific region in Brazil. We selected the federal state Bahia that covers Tropical semideciduouse forest, Cerrado (Savanna) and Caatinga (Thorny Shrub). It will review available evidence/tools that can be used for demonstrating compliance.

[The Highly biodiverse case study is still under development and will be added soon]

D.2. Findings waste and residues cases studies

In the following table we present the summary of evidence types that were identified in the case studies as available to demonstrate compliance.

Some resulting findings were used to detail the approach (of which the resulting approach is presented in section 3.2.

- All of the case studies needed a combination of Tier 1 and Tier 2 evidence (none were able to demonstrate all elements on Tier 1) – a combination of tiers is possible, so this is not a problem (specified in the approach).
- Most case studies presented similar results (types and level of evidence) – except for Poland where they had one additional practice available through Tier 1 evidence.
- In some cases, not all management practices appeared to be relevant for that specific setting (e.g. acidic soils). An addition has been made to the approach to allow operators to supply evidence in case a specific measure is not relevant in their case.
- In most cases demonstrating evidence was possible, some of the management practices are not that wide-spread yet, but the new CAP as well as other initiatives will likely make these practices more wide-spread/applied.

Table 26. Summary of types of evidence identified in the case studies to demonstrate compliance

Requirement	Level of demonstration	Evidence and monitoring system
		Self-declaration by the farmer + government inspections
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	Tier 2	Self-declaration by the farmer + Independent third-party auditor Documentation on crop rotation and area used for CAP subsidy calculation.
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	Tier 2	Self-declaration by the farmer + government inspections Self-declaration by the farmer + Independent third-party auditor Documentation on crop rotation and area used for CAP subsidy calculation.
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	Tier 2	Self-declaration by the farmer+ government inspections Self-declaration by the farmer
	Tier 1 (PL)	Compliance with CAP subsidy requirements as monitored by ARiMR
No burning of arable stubble except where authority has granted an exemption for plant health reasons	Tier 1	Evidence of farmers receiving CAP subsidies (conditionality)
		Municipalities are responsible for monitoring and enforcement. Compliance with CAP subsidy requirements as monitored by ARiMR
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity	Tier 2	Self-declaration by the farmer+ government inspections
		Self-declaration by the farmer Self-declaration by the farmer + Independent third-party auditor

Case study – Spain

Key findings

The market for residues of non-perennial crops for bioenergy is still limited in Spain, because of their low profitability. In general, it is a local market, comprised of small companies that buy the residues from producers, process it and sell it to final consumers as a complement to other activities. The most used residue is straw, which is used to produce electricity and to produce thermal energy with small domestic heaters.

There are no national rules on soil management in Spain, besides those established by the conditionality and greening rules of the CAP. Therefore, evidence gathering and monitoring of soil management practices need to be done at the farm level (Tier 2). An exception is the requirement of stubble burning, which is a conditionality rule of the CAP. Compliance with this rule can be demonstrated by farmers with a proof of receipt of CAP fundings, so it can be considered Tier 1.

As regards the list of essential soil management practices examined in this report, the consulted stakeholders provided the following remarks:

- A 5-crop rotation may be too demanding and not always possible in Spain (4 crops is probably more reasonable). In addition, different requirements should be established for different ranges of farm sizes (as in the greening rules).
- In Spain (and especially in rainfed land) coverage with live plants is not always possible (during the summer the plants dry out). The requirement should rather be of non-bare soil (soil could be covered by stubble rather than with live plants).
- Intermediary crops cannot be used in rainfed land, because in non-irrigated land there is only a harvest per year (in less productive areas even a harvest every two or three years).
- In Spain, the main concerns are not so much soil compaction or acid soils but soil loss due to erosion. For this reason the rules aiming at preventing soil compaction or applying liming on acidic soils are not very relevant.

Requirement	Level of demonstration	Evidence and monitoring system
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	Tier 2	Self-declaration by the farmer + government inspections
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	Tier 2	Self-declaration by the farmer + government inspections
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	Tier 2	Self-declaration by the farmer+ government inspections
No burning of arable stubble except where authority has granted an exemption for plant health reasons	Tier 1	Evidence of farmers receiving CAP subsidies
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity	Tier 2	Self-declaration by the farmer+ government inspections

Introduction

Spain is the fifth most important producer of straw-generating crops in the EU¹¹², and therefore has a great potential as regards bioenergy generation from agricultural residues. Agricultural residues from non-perennial crops are mostly used on a small scale and on farm or locally, with the exception of straw, which is also used as a feedstock by some power plants.

Besides law 22/2011 and Royal Decree 9/2005 on soil pollution, there is no legislation to protect soil in Spain. However, some of the cross-compliance rules of the CAP are relevant to soil quality, including GAEC 6 (ban on stubble burning, except for phytosanitary reasons), GAEC 1 (establishment of buffer strips along watercourses), GAEC 5 (tillage management or other appropriate cultivation techniques to limit the risk of soil degradation, taking into account slope), GAEC 4 (protection of landscape features).

In addition, CAP's greening rules (as detailed in Royal Decree 1078/2014) have relevance for soil quality. They require that farms with farmland between 10 and 30 ha use at least two crops (none of them must cover more than 75% of farmland), whereas farmland over 30 ha must include at least three different crops (none of them must cover more than 75% of the overall farmland, and the two main crops cannot cover more than 95% of the farmland). In addition, farms with more than 15 ha of farmland are required to dedicate at least 5% of their land to one of the four Ecological Focus Areas that have been chosen by Spain (nitrogen-fixing crops, fallow, forests and agroforestry). Compliance is monitored by FEAGA (the Spanish paying agency).

There are no rules in place to limit the extraction of agricultural residues or to require farmers to prepare a soil management plan. Residue retention on land is not commonly practiced in Spain. Farmers leave on land sunflower stems and heads, as well as corn hobs, which do not have other use and does not have a market. However, straw is often removed and used for livestock or industrial purposes (e.g. animal feed and bedding, mushroom production, construction/packaging/paper industry). In general, straw is only left on land when there is no other use and no market for it (this can vary significantly from year to year, because the amount of straw produced can vary each year). The market for agricultural residues is usually local because its low calorific value makes transport expensive. Agricultural residues are normally traded by small companies that process and sell the residues as a complement to other activities.

In general, Spanish farmers are increasingly aware of the practices needed to improve soil quality and maintain organic matter. Minimum tillage and direct sowing are more and more used, and the use of seasonal deep tillage has decreased significantly over recent years. Although still not common, plant cover crops are being introduced in irrigated land and for permanent crops. Crop rotation is not common, but it is increasingly practiced to improve soil quality, reduce the need of fertilisers and herbicides. Legumes as part of crop rotation are mainly used in rainfed land (in irrigated land they are only used for some types of crops, e.g. beets).

As regards future developments, the National Energy and Climate Plan 2021-2030 (Plan Nacional Integrado de Energía y clima - PNIEC) envisages a significant increase in the use of residues for bioenergy.

According to information provided by the Ministry of Agriculture, the current discussion on best practices to include in the post-2020 CAP to maintain soil quality are:

- Incorporation of pruning remains in the soil,
- Establishment of cover crops,
- Conservation agriculture (direct sowing),
- Promotion of organic farming,
- Promotion of rotations with crops that improve soil quality.

In the post 2020 CAP conditionality rules will probably include GAECs related to adequate tillage management to limit erosion, minimum soil cover in sensitive periods, crop rotation / diversification

¹¹² Ecofys (2013) Low ILUC potential of wastes and residues for biofuels.
http://www.mvak.eu/test5674213467/Ecofys_2013_low_ILUC.pdf

(they are still being negotiated). In addition, eco-schemes related to the retention of pruning wastes in the land and crop rotation practices including legumes are currently being discussed. These will strengthen the agro-environment measures that the Autonomous Communities (i.e. regional governments) will include in their RDPs. The future CAP will probably include simple obligatory rotations as a conditionality rule and more sophisticated rotation systems for eco-schemes and agro-environmental measures of the RDPs. In addition, measures put in place to implement the Farm to Fork Strategy will contribute to improve soil quality, and in particular those related to increasing organic production and reducing fertilizers and plant protection products.

The provision of advisory services to farmers will be essential to guide decisions as to whether soil management practices are required and which ones to use, be they retention of agricultural residues on soil or other practices like e.g. minimum tillage, conservation agriculture, grass/leguminous cover, crop rotation, use of organic compost, etc.

Background questions

1.	<i>Please indicate which region/location is looked at.</i>
	Spain
2.	<i>Please indicate in 1-2 sentences why this region is of interest for this specific case study.</i>
	Spain is the fifth country in the EU as regards production of straw-generating crops ¹¹³ , and therefore has a great potential for bioenergy generation from agricultural residues (see González Sánchez et al., 2018 ¹¹⁴).
3.	<i>Please indicate if there are specific boundary conditions you want to mention.</i>
	Not applicable – this report is about the entire country
4.	<i>Please indicate the make-up of the farming sector in the country under consideration ie average farm size, productivity, extent of organic production, intensive vs extensive management etc. Are there regional differences in the scale of farms?</i>
	Spain is very heterogeneous in terms of size, dimension, productive orientation and productivity of farms. In general, irrigated land is used for intensive agriculture, while rainfed land is generally used for extensive agriculture and husbandry.

Understanding soil protection baselines

To check whether the sustainable production criteria is met, the following questions are the main focus of this section based on the five sub-criteria previously outlined:

4.i	<i>Is legislation in place to protect soil quality and soil carbon? (if yes, please briefly reference and describe this)</i>
	<p>Law 22/2011 on contaminated waste and soil regulates waste management, promotes measures that prevent generation of wastes and mitigate the adverse impacts on human health and the environment. Royal Decree 9/2005 establishes the list of potentially polluting soil activities and the criteria and standards for the declaration of contaminated soil. The first one is being revised and will be replaced by a law that will transpose EU Directive 2018/851 on waste and Directive (EU) 2019/904 on reducing the impact of certain plastic products on the environment.</p> <p>Law 42/2007 on Natural Heritage and Biodiversity establishes the basic legal regime for the conservation, sustainable use, improvement and restoration of biodiversity and natural resources (among which soil is listed).</p>

¹¹³ Ecofys (2013) Low ILUC potential of wastes and residues for biofuels.

http://www.mvak.eu/test5674213467/Ecofys_2013_low_ILUC.pdf

¹¹⁴ González Sánchez E. J., Veroz González O., Gil Ribes J., Ordóñez Fernández R. M. (2018). Iniciativa 4 por mil: el carbono orgánico del suelo como herramienta de mitigación y adaptación al cambio climático en España. Informe por la Oficina Española de Cambio Climático. Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente https://www.miteco.gob.es/es/cambio-climatico/publicaciones/publicaciones/4por1000_tcm30-438109.pdf

	<p>Some of the CAP's conditionality rules are relevant for soil quality. They were transposed through Royal Decree 1378/2018, which sets the rules for the application in Spain of the Common Agricultural Policy. The relevant rules are:</p> <ul style="list-style-type: none"> • GAEC 6 Ban on stubble burning, except for phytosanitary reasons. This measure aims to protect the organic matter of the soil, its microbiota and to reduce erosive processes. • GAEC 1 Establishment of buffer strips along watercourses. This measure aims to reduce water contamination and also indirectly reduce runoff. • GAEC 5 Tillage management or other appropriate cultivation techniques to limit the risk of soil degradation, taking into account the slope. This measure aims to minimize the risk of erosion by forbidding tilling the land across contour lines. Arable land should not be tilled in the direction of the maximum slope when slope is equal to or greater than 15%, unless the actual slope is compensated by terraces. • GAEC 4 Minimum soil cover in the most sensitive periods and areas. This measure also aims to reduce soil erosion, • GAEC 7 Maintenance of topographical features and prohibition of cutting hedges and trees during the breeding and reproduction season of birds <p>In addition, the greening rules have relevance for soil quality, and in particular those related to crop rotation and diversification. They are largely adopted, because they lead to an increase of the basic payment by 50%.</p> <p>According to information provided by the Ministry of Agriculture, rules to maintain soil quality will be included in a future royal decree on sustainable nutrition that is currently being developed. In addition, the Action Plans for nitrate vulnerable zones and the integrated production labels require the preparation of fertilization plans.</p> <p>The National Action Programme to Combat Desertification is also relevant to soil quality, which stems from the UN Convention to Combat Desertification. The Programme sets an integrated framework for the management and possibly forecasting of desertification process and aims to integrate and complement existing initiatives both on agricultural and forest land. The Spanish NAP only includes a small number of actions to complement existing initiatives. These include integrating the evaluation and prediction of desertification in the country, analysing and disseminating research results, and establishing a network of pilot projects for restoration and sustainable management of areas affected by desertification. It also proposes an institutional framework for this integration of existing efforts: a Desertification Observatory, and a Technical Office.</p>
4.ii	<p><i>Is soil quality and/or soil carbon/soil organic carbon defined in legislation in the country? (if yes, please briefly reference and describe this)</i></p>
	<p>No</p>
4.iii	<p><i>What mechanisms are there in place in country to monitor soil quality?</i></p>
	<p>The Spanish National Inventory of Soil Erosion is a Geographical Information System for monitoring and assessing soil erosion processes in both forest and agricultural land. Its main objectives are to identify, quantify and cartographically reflect the main areas of soil erosion in the country and to assess the development of soil erosion in Spain by comparing consecutive inventories. The five types of erosion assessed are: sheet and rill erosion, gully erosion, mass movements, stream-bed erosion and wind erosion. Data are collected with a 10 years frequency, with 1:50,000 scale maps and an intense fieldwork under taken to gather vegetation, land use and soil data (5x5 km UTM grid sampling plot). Results inform the National Plan of Priority Actions for Forest-Hydrological Restorations and for the National Action Plan to Combat Desertification (both included in the Spanish Forest Law). They are also used to define CAP Greening Payment Requirements and CAP Rural Development Programme 2014-20, National and Regional Programmes.</p> <p>In addition, Autonomous Communities (i.e. regional governments) are required to prepare an inventory of the contaminated soils and to prioritise the most important ones (Law 22/2011 on contaminated residues and soils and Royal Decree 9/2005, which establishes the list of potentially soil activities and the criteria and standards for the declaration of contaminated soils). The Ministry of Agriculture, Food and Environment uses this information to prepare the state inventory of contaminated soils.</p> <p>Beyond erosion/desertification and contamination, no other soil threats or functions are monitored at the national level, and there is no official national soil monitoring programme. However, some Autonomous Communities are collecting data on the organic content of soil¹¹⁵.</p>

¹¹⁵ Information provided by UPA

4.iv	<i>Are land managers required to develop soil management plans or similar? (if yes, please explain their specification/coverage)</i>
	No.
4.v	<i>Are rules in place to limit residue extraction linked to agricultural crops?</i>
	No. GAEC 6 establishes that extraction of residues should be carried out in accordance with existing legislation.
4.vi	<i>Are incentives or rules in place promoting the use of agricultural residues for bioenergy? (if yes please briefly reference and describe)</i>
	<p>There is no specific target in Spain for the use of agricultural residues for bioenergy (electrical or thermal production)¹¹⁶.</p> <p>The Royal Decree 413/2014 establishes a premium tariff for power plants using renewable energy, including agricultural residues, to top up the market price of electricity. The premium tariff is calculated on the basis of the additional investment and operation costs with respect to competitive electricity sources. The Royal Decree 947/2015 set a call for the allocation of the specific premium tariffs for new plants of electricity production from biomass (the required installed power for bioenergy is 200 MW). The first auction for the allocation of specific remuneration regime to facilities for the production of electrical energy from biomass was issued in 2016¹¹⁷. Finally, IDAE (a public body) offers grants for the development of businesses that use bioenergy from residues¹¹⁸.</p> <p>The Ministry of Agriculture, Fisheries and Food offers grants in the framework of the national RDP to analyse the potential cooperation between agri-food producers and bioenergy producers to develop a more efficient use of energy in the transformation of agri-food products. The budget for these grants is 240,000.00 per year (of which, 80% is provided by the EAFRD). The maximum budget per project is € 60,000. Also, some of the measures included in the RDPs of the Autonomous Communities support the production of bioenergy.</p> <p>Spain's RDP 2014-2020 includes Focal Area 5 C "Facilitate the supply and use of renewable energy sources, by-products, waste and residues and other non-food raw materials to drive the development of the bioeconomy". This Focal Area is covered by Measure 16 "Cooperation", which, among other objectives, aims to "facilitate the supply and use of renewable energy sources, by-products, waste, residues and other non-food raw materials to promote the development of the bioeconomy".</p>

Understanding use of agricultural residues/residue market

5.i	<i>Is there evidence of use of agricultural residues already within the bioenergy sector? (if yes for what purposes and to what extent)</i>
	<p>34 biomass power generation plants are currently operating in Spain, with a cumulative installed power slightly over 700 MW. Of these, about 180 MW use agricultural residues, with an annual consumption of approximately one million tonnes per year¹¹⁹.</p> <p>The agricultural residues that are mainly used to produce thermal energy and electricity in Spain are olive pits, olive pomace, and pruning / removals of permanent crops (mostly in southern Spain), as well as almond shells¹²⁰.</p> <p>As regards agricultural residues from non-permanent crops, their use as an energy source is not widespread. According to Rodero et al. (2019), a wide range of barriers hinder the use of agricultural residues for bioenergy, including logistics, difficult combustion and inadequate equipment¹²¹. The residue that is mostly employed is straw, which is used as a feedstock in a few power plants and on farm to produce thermal energy with small heaters (see for example ACR Ecocalderas).</p>

¹¹⁶ Information provided by UPA.

¹¹⁷ <http://blog.bioplat.org/2018/04/29/normativa-espanola-de-bioenergia/>

¹¹⁸ Information provided by CIRCE.

¹¹⁹ Information provided by UPA.

¹²⁰ Information provided by AVEBIOM.

¹²¹ Rodero Masdemont P., García Galindo D., Mira Uguina A., Jarauta Córdoba C. Á. (2019). Marco actual y nichos de innovación para la agrobiomasa para generarc calor. Claves tecnológicas para el uso de calor con agrobiomasa en pequeña potencia. Presentation at the conference Agrobiomasa, Valladolid, Spain, 26th September 2019. Provided by AVEBIOM.

	<p><u>Acciona</u>, a renewable energy company, has three power plants that use straw as a feedstock. They are:</p> <ol style="list-style-type: none"> 1) <u>Sangüesa</u> in Navarra (installed power: 30.2 MW; feedstock: 160,000 tonnes of straw per year; average production: 200 GWh per year. It covers 5% of the electricity demand of Navarra); 2) <u>Briviesca</u> in Burgos (installed power: 16 MW; feedstock: 102,000 tonnes of straw per year; electricity production: 128 GWh per year); 3) <u>Miajadas</u> in Cáceres province (installed power: 15 MW; feedstock: 110,000 tonnes of corn cane, tree pruning and forest remains per year; electricity production: 128 GWh per year). <p>The company is building two additional power plants for bioenergy in Leon and La Coruña provinces¹²².</p> <p>Most of the cooperatives represented by Agri-food Cooperatives Spain use their residues from wine and oil production to generate energy (through self-consumption or selling it to the electricity network) or to produce biofuels which are then sold. The most interesting experiences as regards the use of residues from non-perennial crops are the following:</p> <ul style="list-style-type: none"> • The Agropal cooperative makes use of straw residues to produce bioenergy for self-consumption. The straw is mainly pelletized and is used as a solid bio-fuel to generate the energy employed in a cheese factory and a dehydrator owned by the cooperative. The cooperative has access to significant amounts of herbaceous waste (especially cereal straw) from the plots of its members. These residues have only limited use as fertilisers and have no market (due to the high costs of their collection as compared to their calorific content). For this reason, AGROPAL has recently bought two new heaters, which use biomass as sole feedstock. Industries in the area, as well as public buildings (local and regional administration), have recently shown interest in purchasing biomass pellets that AGROPAL could produce using agricultural residues of its partners. • The Sovena company has a plant in Andújar where sunflower pipes are husked and used for self-consumption in a mixed boiler. They are also pelletized for sale. <p>Corn hobs are not used to produce bioenergy in Spain yet. The European project Sucellog analysed the feasibility of its use by Agrària de Miralcamp, a company specialising in cereal dehydration located in Catalonia, both for self-consumption and commercialisation to a nearby pig farm, and concluded that such an initiative can be successful¹²³.</p>
5.ii	<p><i>Is the use of residue retention on land common practice as a mechanism for soil protection? Or required legally?</i></p>
	<p>Mechanisms for soil protection are not mandatory in Spain, and the farmers can decide how to use their residues.</p> <p>According to the information provided by the Ministry of Agriculture and Agri-food Cooperatives, residue retention on land is not commonly practiced in Spain, except in farms practicing organic agriculture and direct sowing (regenerative agriculture).</p> <p>Herbaceous rainfed agricultural residues are usually removed from the land once harvested and are used in the livestock or industrial sector. In general, farmers leave on land the straw that they cannot sell. The decision on whether or not to remove the straw depends significantly on the needs of the livestock and the amount of straw that is available each year. In general, it is important to note that in dry land the amount of straw produced each year can vary significantly. In irrigated land, and especially the land used for spring cereals, residues are retained in the soil not so much as a protection measure but as an agricultural practice to facilitate a second sowing. The sunflower stems and heads are often chopped and left on land. Since the yield of this crop is usually quite low, the amount of residues generated is low and therefore organising a logistic chain for the collection and use of this residue for bioenergy would not be economically feasible. Corn cobs are often returned to the land because they don't have a market, and not really as an agronomic practice. Woody agricultural residues (pruning remains) are removed and in most cases burned to prevent the spread of pests. In recent years, the use of this type of waste for energy use has increased¹²⁴.</p>
5.iii	<p><i>If residues are not used for bioenergy are there other existing uses of agricultural residues? (i.e. material uses)</i></p>
	<p>Agricultural residues used for bioenergy are those that remain once other needs have been covered. The residues of cereal crops are normally used for:</p>

¹²² <https://www.acciona-energia.com/es/areas-de-actividad/otras-tecnologias/biomasa/>

¹²³

https://www.sucellog.eu/images/Publications_and_Reports/SUCELLOG_D6.5a_Individual_auditing_studies_and_diagnosis_in_Spain_ES.pdf

¹²⁴ Information provided by Agri-food Cooperatives Spain and UPA.

	<ul style="list-style-type: none"> • Animal feed, either directly or in the composition of granulated feed and fodder • Animal bedding • Agri-food industry (mushroom production) • Other uses (construction, packaging, paper industry) <p>Woody agricultural residues (from pruning of fruit trees, olive trees and vines) have no other significant uses besides the production of thermal energy on farm with small-scale domestic heaters¹²⁵.</p>
5.iv	<p><i>What is the market infrastructure for the buying and selling of residues at present? (informal/local; coordinated/through traders or other points at which material is gathered together?)</i></p> <p>The market for agricultural residues is usually local in nature, since transport costs tend to undermine the competitiveness of this type of biomass if the distance covered is too long. In general, agricultural biomass tends to have lower quality than forest biomass, both in terms of calorific value and ash concentration / chlorine problems. For this reason, in general it is only competitive close to where it is produced¹²⁶.</p> <p>Agricultural residues are mostly traded by small companies that process the residues at the origin or destination point, and then market them to final consumers. In many cases, agricultural residues are sold as a complement to other activities. There is a national association of straw production and marketing companies, ANIP¹²⁷.</p>
5.v	<p><i>If residues are already being used for bioenergy feedstock, what is the sourcing area from which they are taken before the first processing step? (ie. are there details of how far the raw material is transported?)</i></p> <p>The average distance between the producers of the herbaceous residues and the bioenergy production plants has been estimated by UPA at about 60 km. According to UPA, for woody agricultural residues, the average distance may increase up to 80 km, as it is a higher density fuel.</p> <p>According to Agri-food Cooperatives Spain, agricultural residues in a range of 30-50 km are normally used. Transport is very expensive compared to the calorific value if densification work is not carried out (pelletizing, chipping, packing, etc.), but this entails high costs that in general are not covered by the low market value.</p> <p>The Ministry of Agriculture indicated that residues are not traded at more than 50 km from the production point, in order to make transport costs feasible.</p>

Legal requirements at national level – land management best practices

6.i	<p><i>Are rules in place determining the practices that should be applied on arable land (for non-perennial crops or cereals) to support soil quality? (if yes, please specify – FYI this could be legal requirements or requirements linked to funding such as under the CAP. Please briefly explain the measures and instruments that support them and how widely they are adopted (if non binding).</i></p> <p>There are a number of cross-compliance rules that aim to maintain soil quality (see above). In addition, the Greening Measures mentioned above are widely followed in Spain because they result in an increase of the basic payment by 50%.</p>
6.ii	<p><i>Please complete table a) below regarding support for management practices in country. Provide any comments on coverage in the box below</i></p>
6.iii	<p><i>How are measures for promoting soil quality monitored to ensure that land management practices comply with requirements? What evidence is used?</i></p> <p>The measures related to cross-compliance and greening are monitored based on the self-declarations that farmers need to prepare to obtain CAP payments.</p>
6.iv	<p><i>How is compliance with measures to promote soil quality enforced?</i></p> <p>Through the farmers' self-declarations for the CAP, remote sensing monitoring and data crossing with other control authorities such as Seprona (Servicio de Protección de la Naturaleza - Nature Protection</p>

¹²⁵ Information provided by UVA and Avebiom

¹²⁶ Information provided by Agri-food Cooperatives Spain.

¹²⁷ Information provided by UPA.

	<p>service), as well as through the registers of phytosanitary products that farmers need to keep according to Royal Decree 1311/2012.</p> <p>Compliance with the measures of the CAP Conditionality are guaranteed through the National Plan of Controls and Criteria for the Application of Penalties of Conditionality, established by the Spanish Fund for Agricultural Guarantee (Fondo Español de Garantía Agraria - FEAGA). Control activities are carried out by the organizations competent of the regional administrations.</p>
6.v	<p><i>Does the country have access to/make use of remote sensing that would be able to differentiate crop type, type of land cover or proportion of land cover? What is the time horizon over which data is replicated (ie annual monitoring, once every 5 years? Etc) (if yes please describe briefly the systems in place, tools used etc)</i></p>
	<p>Remote sensing is increasingly used in Spain¹²⁸, but not significantly used in the agricultural sector. There are some cooperatives and agro-industries that currently use this type of technology. Public bodies do use remote sensing to monitor farmers' practices. The National Remote Sensing Plan can be read here: https://pnt.ign.es/que-es-pnt¹³⁰.</p> <p>The National Plan of Controls and Criteria for the Application of Penalties of Conditionality states that, when appropriate, on-the-spot checks may be carried out using remote sensing techniques. These techniques, currently applied through pilot projects in various Autonomous Communities, will be increasingly used and will allow to distinguish the types of crops and land cover and move towards a digitized, claimless CAP Management and Control System (farmers will be monitored through satellite images and will not need to submit self-declarations). See https://www.fega.es/es/node/50788.¹³¹</p>
6.vi	<p><i>Are there other forms of relevant monitoring or compliance rules that could be relevant to support evidence that measures are implemented?</i></p>

¹²⁸ Information provided by UPA

¹²⁹ Information provided by Agri-food Cooperatives Spain.

¹³⁰ Information provided by Agri-food Cooperatives Spain.

¹³¹ Information provided by the Ministry of Agriculture

Table 27. Overview of the essential soil management practices referencing where rules are in place at the national level (or regional depending on case study) to support these practices¹³²

Requirement	Rules in place of relevance (description, scope)		Reference to legal text	Details of relevant compliance/monitoring approaches
	Y/N Partial	Description		
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	Partial	<p>The practice of crop rotation is not mandatory in Spain, with the exception of specific farming systems such as organic farming or in the integrated production of certain crops.</p> <p>In conventional agriculture, however, crop diversification (different crops in space, not temporal succession) is mandatory under the CAP's greening rules, which require farms with farmland of between 10 and 30 ha (both included) to employ at least two different types of crops (none of them must cover over 75% of the overall farmland). If the farmland is above 30 ha, there must be at least three different crops (none of them must cover more than 75% of the overall farmland, and the two main crops cannot cover more than 95% of the farmland).</p>	<p>Royal Decree 1078/2014, which establishes the rules of conditionality to be met by beneficiaries of direct payments.</p> <p>Regulation 2018/848 on organic agriculture.</p> <p>As regards integrated production, different Autonomous Communities have different rules.</p> <p>Royal Decree 1075/2014 (art. 20), based on Regulation 1307/2013 on crop diversification.</p>	<p>FEGA (Spain paying agency), tracks green payment measures (see here one of its reports here)</p>
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	Partial	<p>These practices are not mandatory at the moment, although there are measures that support cover crops in the RDPs of some Autonomous Communities (for example, to promote cover crops in olive groves in Andalusia).</p> <p>The current GAEC 4 establishes a minimum ground cover in certain circumstances.</p> <p>The CAP's greening rules require farms with more than 15 ha of farmland to dedicate at least 5% of it to one of the four Ecological Focus Areas that Spain has chosen (nitrogen-fixing crops, i.e. legumes,</p>	<p>Royal Decree 1078/2014</p> <p>Royal Decree 1075/2013, based on Regulation 1307/2013 on Ecological Focus Areas.</p>	<p>See above</p>

¹³² The information used to compile this table has been provided by UPA and the Ministry of Agriculture.

REDIIBIO project

Requirement	Rules in place of relevance (description, scope)		Reference to legal text	Details of relevant compliance/monitoring approaches
	Y/N Partial	Description		
		fallow, forests and agroforestry). To optimize the environmental benefit of nitrogen-fixing crops, they need to be kept on land at least until the beginning of the flowering season. Furthermore, to avoid the risk of leaching of the nitrogen accumulated in the soil by these crops during the fall, leaving the land fallow is not allowed.		
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	No			
No burning of arable stubble except where authority has granted an exemption for plant health reasons¹³³.	Yes	GAEC 6 requires the maintenance of the level of organic matter in the soil through appropriate practices, including the prohibition of burning stubble, except for phytosanitary reasons. This prohibition does not include the remains of pruning woody crops.	Royal Decree 1078/2014	See above
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity	No			

¹³³ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392

On farm land management best practices

7.i	<p><i>What tools are being made use of on farm to ensure soil quality is protects and soil carbon promoted? What is considered best practices, what is considered standard good practices?</i></p>																									
	<p>The conditionality rules of the CAP determine the practices to ensure soil quality (see above).</p> <p>In general, farmers are increasingly aware of the practices needed to improve soil quality, and in particular to maintain organic matter. Minimum tillage and direct sowing are more and more used in Spain. Both techniques improve the organic carbon content of the soil¹³⁴.</p> <p>According to Agri-food Cooperatives Spain, seasonal deep tillage on arable crops has decreased significantly in recent years. Although still not common, plant cover crops are being introduced in land used for permanent crops.</p> <p>A number of measures included the RDPs of some Autonomous Communities aim to improve soil quality. The following table lists those related to non-perennial crops¹³⁵:</p> <table border="1" data-bbox="288 696 1385 1178"> <thead> <tr> <th>Autonomous Community</th> <th>Measure</th> <th>Practice</th> </tr> </thead> <tbody> <tr> <td>Andalusia</td> <td>Sustainable herbaceous crops in rainfed land</td> <td>Direct sowing</td> </tr> <tr> <td>Aragón</td> <td>Maintenance of stubble</td> <td>No tillage</td> </tr> <tr> <td>La Rioja</td> <td>Fight against erosion in fragile land</td> <td>No tillage</td> </tr> <tr> <td>Murcia</td> <td>Soil and water conservation</td> <td>Vegetal cover</td> </tr> <tr> <td rowspan="2">Extremadura</td> <td>Steppe birds and promotion of conservation agriculture in herbaceous crops</td> <td>Minimum tillage</td> </tr> <tr> <td>Conservation agriculture in slope areas</td> <td>Vegetable crops</td> </tr> <tr> <td rowspan="2">Castilla la Mancha</td> <td>Agricultural practices in extensive rainfed arable copes in SPA zones of steppe birds</td> <td>No tillage</td> </tr> <tr> <td>Soil protection against erosion with herbaceous rain-fed crops</td> <td>No tillage</td> </tr> </tbody> </table>	Autonomous Community	Measure	Practice	Andalusia	Sustainable herbaceous crops in rainfed land	Direct sowing	Aragón	Maintenance of stubble	No tillage	La Rioja	Fight against erosion in fragile land	No tillage	Murcia	Soil and water conservation	Vegetal cover	Extremadura	Steppe birds and promotion of conservation agriculture in herbaceous crops	Minimum tillage	Conservation agriculture in slope areas	Vegetable crops	Castilla la Mancha	Agricultural practices in extensive rainfed arable copes in SPA zones of steppe birds	No tillage	Soil protection against erosion with herbaceous rain-fed crops	No tillage
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7.ii	<p><i>Are there quality standards or best practices standards or labels, supply chain schemes that promote better soil quality or soil carbon as part of their requirements? If yes, please provide details including the management practices covered</i></p>																									
	<p>The agri-food sector is currently moving towards more ambitious sustainability standard, including on conservation of soil quality, through operational projects within the Rural Development Strategy EIP (e.g. the Go Innovatriggo group)¹³⁶.</p>																									
7.iii	<p><i>Is crop rotation standard practices on farm (in particular those producing high residue crops such as cereals (including maize)? If so, what crop rotations are being implemented?</i></p>																									
	<p>According to estimates of the Ministry of Agriculture, a 3-year crop rotation is practiced in around 7% of the 8.5 million ha of rainfed land used for cereals, fallow, oilseeds and legumes. The most common rotations are:</p> <ul style="list-style-type: none"> • Cereal / legume / cereal • Legume / cereal / legume • Legume / cereal / fallow • Oilseed / cereal / legume <p>According to information provided by UPA, even if crop rotation is not common in Spain, its use is increasing significantly for agronomic reasons, i.e. to increase efficiency in the use of inputs, fight against weeds and improve soil quality. In rainfed land, the most commonly used rotation is: cereals (barley, wheat), oilseeds (sunflower, rapeseed), nitrifying crops (legumes, protein crops).</p> <p>Most corn farmers practice monoculture¹³⁷.</p>																									

¹³⁴ Information provided by UPA.

¹³⁵ Information provided by Spanish Association of Soil Conservation

¹³⁶ Information provided by the Ministry of Agriculture.

¹³⁷ Information provided by Agri-food Cooperatives Spain.

7.iv	<i>Are cover crops standard practices on farm (in particular those producing high residue crops such as cereals (including maize)? If so, what are they being used as (intercrops, winter crops etc) and are there strategies in place to limit bare soil?</i>
	According to the Ministry of Agriculture, the use of cover crops is not a standard practice. However, while in general cover crops are not used in rainfed land, they are sometimes used in irrigated land, e.g. for beets (a legume is sown in autumn, which is incorporated into the soil before the sowing of the beet). In general, residues are not removed when there is more risk of strong storms, and therefore erosion) ¹³⁸ .
7.v	<i>Are legumes standard practices as part of crop rotations and cover cropping regimes?</i>
	<p>They are in rainfed land. In irrigated land, they are practiced only for some type of crops, such as beets. In general, they are used only in some areas, where they are traditional and where there is a market for them¹³⁹.</p> <p>The CAP promotes legumes through coupled payments to protein crops, subsidies to the quality of legumes, as well as through the Ecological Focus Areas in the greening rules (see above). In addition, legumes are promoted through different agri-environmental measures in the RDPs prepared by the Autonomous Communities¹⁴⁰.</p> <p>Legumes will be supported in the future through the CAP, in the framework of the National Protein Plan, which aims to reduce dependence on imported plant proteins. The possibility of establishing eco-schemes in the future CAP to promote legumes and crop rotation involving legumes is under discussion.</p>
7.vi	<i>Are there standard practices adopted in terms of working of wet soils?</i>
	Not especially, only the ones that are best for agronomic reasons ¹⁴¹ .
7.vii	<i>What advisory services are in place or would be needed to support and promote the adoption of practices in table b?</i>
	<p>Regulation 1305/2013, which rules the rural development policy, establishes the obligation for RDPs to adopt measures aimed at ensuring that sufficient advisory capacity is available on regulatory requirements, and includes incentives for it. In addition, producer associations, such as professional agricultural organizations or cooperatives, have technical advisory services¹⁴².</p> <p>However, advisory services are poorly developed in Spain and need to be improved to inform farmers about the need to improve soil fertility¹⁴³.</p>
7.viii	<i>What sources of information to demonstrate compliance would be held on farm or could be produced to meet compliance needs (see list in table 2)? Please briefly describe examples of evidence and what they could be used to demonstrate</i>
	<p>The control and monitoring of CAP measures is carried out by the Spanish Fund for Agrarian Guarantee (Fondo Español de Garantía Agraria - FEAGA) at the national level (in a coordinating role), and by the various competent bodies of the Autonomous Communities at the regional level. The indicators to be used to monitor the achievement of the post 2020 CAP's objectives are currently being discussed¹⁴⁴.</p> <p>An indicator that can be used to monitor compliance is the organic matter content of the soils. The problem with this indicator is that changes are not immediate, and also the indicator gives different results in different climatic conditions, besides being expensive to measure. However, it could still be viable to monitor trends within each geographic area¹⁴⁵.</p>

¹³⁸ Information provided by UPA.

¹³⁹ Information provided by Agri-food Cooperatives Spain.

¹⁴⁰ Information provided by the Ministry of Agriculture.

¹⁴¹ Information provided by Agri-food Cooperatives Spain.

¹⁴² Information provided by the Ministry of Agriculture.

¹⁴³ Information provided by UPA.

¹⁴⁴ Information provided by the Ministry of Agriculture.

¹⁴⁵ Information provided by UPA.

Table 28. Overview of the essential soil management practices referencing where it is known farmers are already implementing some aspects either as standard practice, or best practice

Requirement	Adopted as standard or best practice		What evidence might be used on farm to prove adoption?	Are there limits to potential application?
	Y/N Partial	Description of how and where is noted to be applied and what the drivers are for this		
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	Partial	CAP conditionality rules require larger farms to use at least 3 different crops (see above)	Farmers' self-declaration	<p>According to the UPA representative consulted for this report, different requirements should be established for different size ranges of farms. He believes that requiring a 4-crop rotation is more reasonable.</p> <p>The representative of the Ministry of Agriculture also believes that a 5-crop rotation is too demanding and not always possible.</p>
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	Partial	CAP conditionality rules require that a share of the farmland is covered by nitrogen fixing crops or is left fallow (see above)	Farmers' self-declaration	<p>In Spain and especially in rainfed land, coverage with live plants is not possible, because during the summer the plants dry out. Non-bare soils should be required instead, either by live plants or by stubble.</p> <p>The concept of intermediary crops cannot be used in rainfed land either, because they have one harvest per year and in less productive areas even one harvest every two or three years.</p> <p>In general, encouraging the use of nitrogen-fixing crops is a good practice (it also reduces the periods when the soil is bare).</p>
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	No	Farmers who practice direct sowing already put in place these practices.	Difficult to prove adoption.	<p>Soil compaction is not the main concern of rainfed land farmers (the majority of farmers in Spain). The problem of rainfed land is the lack of water, not the excess of it, even though there may be excess of water due to torrential rains at specific times.</p> <p>All in all, in Mediterranean countries the concern is not so much compaction, but soil loss due to erosion.</p>

Requirement	Adopted as standard or best practice		What evidence might be used on farm to prove adoption?	Are there limits to potential application?
	Y/N Partial	Description of how and where is noted to be applied and what the drivers are for this		
No burning of arable stubble except where authority has granted an exemption for plant health reasons¹⁴⁶.	Yes	GAEC N 6 establishes a prohibition to burn arable stubble.	Through controls, data crossing with Seprona (Servicio de Protección de la Naturaleza - Nature Protection service),	
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity	No		Fertilization plans that are required by the Action Programmes for nitrate vulnerable zones or for integrated production labels	Not so relevant in Spain, where there are many more basic agricultural soils than acid soils.

Background information

The stakeholders who provided information for this case-study are:

- Clara Á. Jarauta-Córdoba. Centro de Investigación de Recursos y Consumos Energéticos - Research Center for Energy Resources and Consumption (CIRCE), <https://www.fcirce.es/>
- Javier Alejandro. Unión de Pequeños Agricultores y Ganaderos - Association of Small Farmers and Breeders (UPA), <https://www.upa.es>
- Óscar Veroz González. Asociación Española Agricultura de Conservación / Suelos Vivos – Spanish Association for Conservation Agriculture
- Pablo Fernández Álvarez de Buergo. Cooperativas Agro-alimentarias España - Agri-food Cooperatives Spain (the organization that represents the economic and social interests of the Spanish agri-food cooperatives), <http://www.agro-alimentarias.coop/inicio>
- Pablo Rodero Masdemont. Asociación Española de Valorización Energética de la Biomasa - Spanish Bioenergy Association (AVEBIOM), <https://www.avebiom.org>
- Paz Fentes Piñeiro, General Sub-directorate for Herbaceous and Industrial Crops and Olive Oil, General Directorate of Agricultural Productions and Markets, Ministry of Agriculture, Fisheries and Food.

¹⁴⁶ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392

Case study – Denmark

Key Findings

The case study for Denmark is based on literature review of a number of journal articles and other publicly available documents, as well as interviews with a number of stakeholder expert interviews, including the Danish Biogas Association, The Danish Straw Supply Association, and the Danish Agriculture & Food Council. Other stakeholders and academics were contacted, including government officials, but these did not respond or did not wish to respond to questions. Although some regional differences are noted, the analysis can apply to all of Denmark since the same legal framework is applicable throughout the country. Ideally it may have been ideal to correspond with more stakeholders particularly from civil society to give different perspectives. However, those who were interviewed represent the most important sectors in the field, and in combination with the literature review give a reasonably complete overview of the situation in Denmark with regard to the sustainability of bioenergy from agricultural residues.

The agricultural residues market has been fairly stable for quite a few years now, and remains dominated by straw from cereal crops. There is room for considerable additional use of straw for bioenergy, with the right technological and regulatory conditions.¹⁴⁷ Although there are experiments in terms of alternative uses outside of bioenergy these are still very experimental. Some indication that biogas is increasingly using straw, but still a small proportion. The government's new headline target for 70% GHG reduction by 2030 will necessitate ambitious new policies in all sectors. In general, the use of bioenergy for heat and electricity is expected to increase slightly over the early 2020s, and decrease thereafter due to reductions of subsidies and increased use of heat pumps. This will mostly affect wood based bioenergy, but may have some influence on agricultural residues as well, though broadly speaking these will remain stable.¹⁴⁸

Denmark has a number of regulations in place to protect soil from pollution, but these in deal only with additions to or contaminations of the soil, not other elements of soil quality, at least not directly, such as compaction, or SOC. Regulations do cover crop rotation and cover crops, in connection with fertiliser rules, although these do not exactly match the proposals in the REDIIBIO project. Some good practices are employed on farms that could be demonstrated at that level. There is a good monitoring and reporting framework in place for the regulations that do exist.

¹⁴⁷ Gylling, M., Jørgensen, U., Bentsen, N. S., Kristensen, I. T., Dalgaard, T., Felby, C., ... Johannsen, V. K. (2016). The + 10 million tonnes study: increasing the sustainable production of biomass for biorefineries. (Updated edition 2016 ed.) Frederiksberg: Department of Food and Resource Economics, University of Copenhagen.

¹⁴⁸ Danish NECP. https://ec.europa.eu/energy/sites/ener/files/documents/dk_final_necp_main_en.pdf

The demonstration of essential soil management practices implementation

Requirement	Level of demonstration	Evidence and monitoring system
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	Tier 2	Self-declaration by the farmer + government inspections
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	Tier 2	Self-declaration by the farmer + government inspections. Satellite monitoring
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	Tier 2	Self-declaration by the farmer
No burning of arable stubble except where authority has granted an exemption for plant health reasons	Tier 1	Municipalities are responsible for monitoring and enforcement.
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity	Tier 2	Self-declaration by the farmer

Introduction

This case study looks at the use of agricultural residues for bioenergy in Denmark. In Denmark's case this is overwhelmingly straw from wheat and barley, as well as some oil crops. The industry and market for agricultural residues is relatively developed and mature and has existed at some scale since the 1990s. Straw is used in a variety of small and large installations to produce heat and electricity, as well as a smaller portion for biogas and liquid fuels. Approximately 1.6 million tonnes of straw is used for bioenergy every year, accounting for about 14% of all bioenergy feedstocks in 2017. Straw accounted for about 6.5% of all renewable energy produced in Denmark. The country has a number of laws and measures to protect soil quality, although not specifically focused on the removal of agricultural residues for bioenergy purposes.

Denmark has a number of regulations in place to protect soil quality, but these deal directly only with additions to, or contaminations of the soil, not other elements of soil quality such as compaction or Soil Organic Content (SOC). Regulations do cover crop rotation and cover crops, in connection with fertiliser rules and the protection of water sources. These rules do not exactly match the proposed sustainability criteria, but are similar in laying out proposed crop rotations and rules for cover crops. Farmers of commercial scale are required to report on their use of fertilisers, crop rotations, and use of cover crops and establish management plans. Monitoring and inspections take place to ensure compliance. In addition, the burning of crop stubble is illegal. Other regulations for the control of pesticides and designation of protected natural areas have an impact on soil quality.

Farmers do generally use a number of good practices for protecting soil quality, including to limit compaction of soils, and use of lime where soils are degraded. Farmers producing straw for bioenergy are aware of the issues around soil quality and the removal of residues and take measures not to remove too much straw, or to otherwise compensate for the loss of organic matter through the addition of other organic matter.

The agricultural residues market has been fairly stable for quite a few years now, and remains dominated by straw from cereal crops. There is room for considerable additional use of straw for

bioenergy, with the right technological and regulatory conditions.¹⁴⁹ Although there are experiments in terms of alternative uses outside of bioenergy these are still very experimental. Some indication that biogas is increasingly using straw, but still a small proportion. The government's new headline target for 70% GHG reduction by 2030 will necessitate ambitious new policies in all sectors. In general, the use of bioenergy for heat and electricity is expected to increase slightly over the early 2020s, and decrease thereafter due to reductions of subsidies and increased use of heat pumps. This will mostly affect wood based bioenergy, but may have some influence on agricultural residues as well, though broadly speaking these will remain stable.¹⁵⁰

Denmark has a good framework for the protection of soils, but some additional measures to deal directly with elements such as soil organic carbon or compaction could be usefully integrated. The issue of residue removal is not dealt with by law, but the resulting losses in soil quality is a challenge that relevant farmers are aware of and generally take steps to mitigate. There are tools available to them to help in decision making around soil quality issues.

Background questions

1.	<i>Please indicate which region/location is looked at.</i>
	Eastern Denmark (although regulatory regime is the same nationally)
2.	<i>Please indicate in 1-2 sentences why this region is of interest for this specific case study.</i>
	Denmark has had a well-developed agricultural residues for bioenergy market for about thirty years. The situation is broadly similar nationally, although some details of market operation are slightly different from west to east. However, the regulatory regime is the same nationally.
3.	<i>Please indicate if there are specific boundary conditions you want to mention.</i>
	n/a
4.	<i>Please indicate the make-up of the farming sector in the country under consideration ie average farm size, productivity, extent of organic production, intensive vs extensive management etc. Are there regional differences in the scale of farms?</i>
	<ul style="list-style-type: none"> • Average farm size: 70 ha, 20% larger than 100 ha¹⁵¹ • The dominating field crops are cereals. Most of the cereals, 75%, are used for animal feed. In value terms dairy and pigs are the most important agricultural products.¹⁵² More than half of the cultivated land is devoted to cereals, with barley and wheat accounting for a large percentage of the total grain harvest. Sugar beets are another leading crop. Oats, rye, turnips, and potatoes are grown in western Jutland, where the soil is less fertile.¹⁵³ • Denmark is the most intensively farmed country in the EU.¹⁵⁴ In 2016, the agricultural area was approximately 2.65 million hectares corresponding to 61.8% of the total area, and 88% of the agricultural area were in rotation with intensive production.¹⁵⁵ Since 2015, organic farming has experienced a renewed growth after some years of stagnation and even decline.¹⁵⁶

¹⁴⁹ Gylling, M., Jørgensen, U., Bentsen, N. S., Kristensen, I. T., Dalgaard, T., Felby, C., ... Johannsen, V. K. (2016). The + 10 million tonnes study: increasing the sustainable production of biomass for biorefineries. (Updated edition 2016 ed.) Frederiksberg: Department of Food and Resource Economics, University of Copenhagen.

¹⁵⁰ Danish NECP. https://ec.europa.eu/energy/sites/ener/files/documents/dk_final_necp_main_en.pdf

¹⁵¹ Danish Agriculture and Food Council. (2016) Facts & Figures: Denmark – a farming country.

¹⁵² https://ec.europa.eu/info/food-farming-fisheries/farming/facts-and-figures/markets/production/production-country/statistical-factsheets_en

¹⁵³ <https://www.britannica.com/place/Denmark/Agriculture-and-fishing>

¹⁵⁴ Lundsgaard R, Nygaard T, Ogstrup L, Damm BI, Fenger NA, Holmstrup G (eds) (2016) Sådan ligger landbruget—tal om landbruget 2015. Danmarks Naturfredningsforening og Dyrenes Beskyttelse, København

¹⁵⁵ DS Nyt (2016) Landmændene dyrkede flere vårafgrøder i 2016. Nyt fra Danmarks Statistisk Nr. 313, 12. juli 2016

¹⁵⁶ Jespersen, L.M., Baggesen, D.L., Fog, E. et al. Contribution of organic farming to public goods in Denmark. Org. Agr. 7, 243–266 (2017). <https://doi.org/10.1007/s13165-017-0193-7>

<ul style="list-style-type: none"> • In 2019, the total organic area was 11.3% of Denmark’s farmland¹⁵⁷ • DK is a net agricultural exporter. Agriculture accounts for 16.8% of total exports. • The country has a generally highly productive, intensive agricultural sector¹⁵⁸ • Farms in eastern Denmark tend to be somewhat smaller than in Jutland.¹⁵⁹

Understanding soil protection baselines

To check whether the sustainable production criteria is met, the following questions are the main focus of this section based on the five sub-criteria previously outlined:

4.i	<p><i>Is legislation in place to protect soil quality and soil carbon? (if yes, please briefly reference and describe this)</i></p> <p>There are a number of laws in place to protect soil quality, not explicitly soil carbon, though it may be protected as a result of some laws, most specifically nature protection rules. These relate primarily to the addition of substances to the soil such as fertilisers, and slurry. Soil pollution regulation in Denmark can primarily be seen through the lens of groundwater and drinking water protection.¹⁶⁶</p> <p>The Waste to Soil Order (<i>Affald til jord-bekendtgørelsen</i>)¹⁶⁰ regulates the direct use of waste for agricultural purposes including sewage sludge. The Order regulates the types of waste that can be used for agricultural purposes. It sets requirements for the quality of the waste, including the sewage sludge, with regard to both the content of heavy metals and selected environmental foreign substances including plastics, as well as hygienic and treatment requirements.</p> <p>A number of regulations are also in place to implement the Nitrates Directive with important implications for soil quality. These involve the regulation of nitrogen inputs, based on location, time of year, condition of soil, quantities, types of inputs, storage, method of spreading, crop rotation, afforestation, establishment of mini-wetlands, and use of catch crops.¹⁶¹ Details can be found in the EPA’s Overview of the Danish regulation of nutrients in agriculture.¹⁶² Important regulations having an impact on fertiliser use and soil include : the Law on the Agricultural Use of Fertilisers and Nutrient reducing measures,¹⁶³ the Environmental Approval Act for Livestock Holdings, and the statutory acts pursuant to these.</p> <p>The Environmental Protection Act also contains provisions for the protection of soil. The Environmental Protection Act § 1 act has the general aim inter alia to protect against pollution of the soil and subsoil, including through the release of solid, liquid or gaseous substances, through noise and vibrations; including shaking, noise.¹⁶⁴ Statutory orders lay down rules with regard to farmyard manure and silage use.</p> <p>The Contaminated Soil Act may have relevance although primarily to industrial pollution.¹⁶⁵</p> <p>Pressure on biodiversity of soils is addressed by a specific national Act on taxation of pesticides, adopted in 2013, containing some fiscal measures to reduce the use of fertilizers and harmful</p>
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¹⁵⁷ <https://foodnationdenmark.com/strongholds/organic/>

¹⁵⁸ <https://www.irishexaminer.com/farming/news/no-one-near-denmarks-farm-worker-productivity-351687.html>

¹⁵⁹ <https://pdfs.semanticscholar.org/1e9b/151c27754b15e658c8fc2c696fcf3babafc3.pdf>

¹⁶⁰ Danish Environmental Protection Agency, *Affald til jord-bekendtgørelsen*, <https://mst.dk/affald-jord/affald/affaldsfraktioner/spildevandsslam/affald-til-jord-bekendtgørelsen/>

¹⁶¹ Danish EPA, *Implementation of the Nitrates directive in Denmark*, <https://eng.mst.dk/trade/agriculture/nitrates-directive/implementation-in-denmark>

¹⁶² Danish EPA, *Overview of the Danish regulation of nutrients in agriculture*, <https://eng.mst.dk/media/186211/overview-of-the-danish-regulation-of-nutrients-in-agriculture-the-danish-nitrates-action-programme.pdf>

¹⁶³ *Lov om jordbrugets anvendelse af gødning og om næringsstofreducerende tiltag*, <https://www.retsinformation.dk/eli/lt/2019/338>

¹⁶⁴ *Environmental Protection Act (lov om miljøbeskyttelse) LBK nr 1218 of 2019*, <https://www.retsinformation.dk/eli/lt/2019/1218>

¹⁶⁵ Basse, Ellen Margrethe, (2020) *Environmental Law in Denmark*. Kluwer Law International B.V., 2020.

	<p>pesticides. Soil protection is not explicitly mentioned in the Act, but the effect of the pesticides on earthworms is included in the calculation of the tax.¹⁶⁶</p> <p>There are some regulatory tools which have an indirect positive impact on erosion (Act on Surveying, Preventing and Remedying Environmental Damages; Act on Agricultural Use of Fertilizers and on Plant Cover). The act adopts the “polluter pays” principle in defining the environmental damage and how to establish responsibility or to remedy it.¹⁶⁶</p>
4.ii	<p><i>Is soil quality and/or soil carbon/soil organic carbon defined in legislation in the country? (if yes, please briefly reference and describe this)</i></p> <p>Soil carbon and soil carbon/soil organic carbon are not defined in legislation.</p>
4.iii	<p><i>What mechanisms are there in place in country to monitor soil quality?</i></p> <p>Monitoring for accumulation of unwanted substances in soil is mandated in the law (see 4.i). Municipalities monitor and ensure compliance. The municipalities must inspect all livestock farms of more than 3 LU regularly (every 3-6 years). The frequency of inspections is not only determined by the size of the farm, but by a systematic appraisal of the environmental risks as well.</p> <p>Industry needs to communicate where sludge is being applied to help enable monitoring. The Danish Agricultural Agency has the supervisory obligation to ensure that sewage sludge used for agricultural purposes complies with the quality requirements.</p> <p>The vast majority (approx. 90%) of all Danish farmers must submit data to the Fertilizer Accounting system each year, which is administrated by the Danish Agricultural Agency. All submitted fertilizer accounts are automatically checked at submission by the IT-system, according to a set of previously defined risk criteria. In addition, the Agency will inspect farms to check cover control of crop rotation planning, including plant cover and catch crops, integrated fertilizer accounting and planning, but also the provisions regarding application of the amount of livestock manure applied. These on-spot inspections regarding fertilizer accounts support the control carried out on basis of the annually submitted data in the fertilizer accounting system. Approx. 1.9 % (data from 2014) of all agricultural holdings are inspected annually.¹⁶²</p>
4.iv	<p><i>Are land managers required to develop soil management plans or similar? (if yes, please explain their specification/coverage)</i></p> <p>No specific soil management plan is required.</p> <p>However, land managers have obligations to develop an agricultural management plan under the implementation of the Nitrates Directive. This is intended to manage nitrates and nutrient inputs, but also has implications for carbon. Measures related to fertiliser use, crop rotation, and cover crops are reported on.</p>
4.v	<p><i>Are rules in place to limit residue extraction linked to agricultural crops?</i></p> <p>There are no rules to limit residue extraction.</p>
4.vi	<p><i>Are incentives or rules in place promoting the use of agricultural residues for bioenergy? (if yes please briefly reference and describe)</i></p> <p>There are subsidies in place for the production of bioenergy, including from agricultural residues.</p> <p>The <i>Biomass Agreement of 1993</i> was a policy milestone in the promotion of biomass. The agreement stipulated a clear objective for cogeneration plants: by 2000, these plants were to be using, on an annual basis, 1.4 million tons of straw and chips (wood biomass) for electricity and district heat production. This stimulated the utilisation of biomass both in central CHP plants as well as in decentralised CHP units. After the year 2000 energy taxes, subsidies, and tariffs were used to further promote biomass.</p> <p>More recently, the <i>Danish Act on the promotion of renewable energy</i> of 2008 provided a support scheme for biomass (among other renewables). For electricity generated by burning biomass, a premium of DKK 0.15 per kWh has been paid, irrespective of whether the electricity is generated by</p>

¹⁶⁶ Ronchi, S., Salata, S., Arcidiacono, A., Piroli, E., & Montanarella, L. (2019). Policy instruments for soil protection among the EU member states: A comparative analysis. *Land Use Policy*, 82, 763–780.
<https://doi.org/10.1016/j.landusepol.2019.01.017>

	<p>plants using biomass exclusively or by plants using biomass in combination with other fuels.^{167[1]} Heat generated by biomass is not given a price support as such, since this market is not liberalised in the same way as the electricity market. As of 2019, this support is limited for existing plants to 15 or 20 years after their construction (depending if they were newly built or converted).¹⁶⁸ The <i>Natural Gas Supply Act</i> provides various premiums for biogas. These subsidies in combination with energy and carbon taxes give biomass and biogas a significant price advantage compared to fossil fuels.</p> <p>A <i>Public Service Obligation (PSO)</i> surcharge on electricity bills has been used to generate funds to invest in renewable energy projects since the 1990s. This will be phased out by 2022 and replaced by funding from general government revenues because the Government aimed to decrease electricity prices and because questions had been raised about the scheme by the European Commission on state aid grounds. Oil boilers were banned in all new constructions by 2017. Taken together, these tax incentives shift the cost/benefit ratio toward biomass use, as well as other renewables.</p>
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Understanding use of agricultural residues/residue market

5.i	<p><i>Is there evidence of use of agricultural residues already within the bioenergy sector? (if yes for what purposes and to what extent)</i></p>
	<p>Agricultural residues traditionally used for energy are straw from cereal (wheat and barley) and oil crop (rape seed) production.¹⁶⁹ In Denmark, the total acreage of cereal and oil crops is about 16,000km² and the actual use of straw for energy purposes about 1.3Tg y⁻¹.</p> <p>The Danish market for primary crop residues is dominated by cereal (wheat, barley) straw. The total annual production of agricultural residues is around 6 Tg with cereal straw accounting for 90% or more. Rapeseed straw accounts for the bulk of the remainder with a marginal contribution of residues from pulses (peas) (0.1–0.3%).¹⁷⁰</p> <p>According to the DSSA, the production level of straw has been fairly consistent for the last few years, with fluctuations from year to year, but with a total production of about 6 million tonnes of straw on average. Slightly more than 1.5 million tonnes are used on average for bioenergy, and roughly the same amount for animal feed and bedding. Roughly 2 million tonnes are unused and left to decompose.</p> <p>History</p> <p>In Denmark, straw has been used as a source of energy for a few decades, but before the mid-1980s predominantly for heating in individual households, farmhouses and in agricultural production facilities.</p> <p>Straw is combusted at a range of scales and for different end-uses. The first straw-fired CHP plants, DH and farm-based installations appeared in 1980s when the first subsidy schemes supporting biomass use in the country were introduced.</p> <p>In addition, the Danish government continuously promotes and supports research and development in the field of bioenergy, and information disclosure on straw opportunities among farmers and other parties. In 1997 there were already an estimated 10 000 straw-fired boilers on farms, and in the period 1980-1999 65 straw-fired DH plants were commissioned in DK.</p> <p>Large-scale CHP plants are operating in Denmark, and have been now for some decades, and this is considered to be one of the backbones of the functioning market for straw.¹⁷¹</p> <p>The use of straw for energy has increased over time and peaked in 2010 at 1.6 Tg. In 2015 consumption was 1.3 Tg with 1.0 Tg used for CHP and district heating. This accounts for 12% of the</p>

¹⁶⁷ Danish Energy Agency (2017b) *Memo on the Danish support scheme for electricity generation based on renewables and other environmentally benign electricity production.*

https://ens.dk/sites/ens.dk/files/contents/service/file/memo_on_the_danish_support_scheme_for_electricity_generation_based_on_re.pdf

[1] Some details of specific premiums as of 2017 for electricity can be found here:

https://ens.dk/sites/ens.dk/files/contents/service/file/memo_on_the_danish_support_scheme_for_electricity_generation_based_on_re.pdf

¹⁶⁸ Wittrup, S (2019) *Ny lov sætter udløbsdato på tilskud til biomasse-strøm.* <https://ing.dk/artikel/ny-lov-saetter-udloebdato-paa-tilskud-biomasse-stroem-222547>

¹⁶⁹ Bentson et al, 2018.

¹⁷⁰ StatBank Denmark, *Business Sectors: Agriculture, Horticulture and Forestry* [In Danish: Erhvervslivets Sektorer: Landbrug, Gartneri og Skovbrug], Statistics Denmark, Copenhagen, DK, 2016.

	<p>renewable energy production in Denmark or 2.8% of the production of primary energy. In 2018 around 50% of the straw production was collected and of this fraction, 45–50% was used for energy generation.¹⁶⁹</p> <p>The costs for straw varies widely depending on yield, harvest techniques, transport distances, storage facilities, payment to farmers for the straw (incl. compensation for removal of nutrients) etc. Thus, the production costs are strongly dependent on local or regional harvesting and handling conditions. In Denmark, the farm gate price of baled straw is estimated to 3.4–3.9 € GJ⁻¹. The direct cost of straw production includes field operations (e.g. baling and transport), storage, insurance, administration and road transport. The nutrient value of straw that must be replaced when straw is harvested, risk and profit should be added to this. Road transport cost has been estimated to 1.2–1.7 € GJ⁻¹, and road transport account for 25–30% of the total cost.</p> <p>Biogas:</p> <p>The biogas industry is starting to use straw. But it is relatively very expensive compared to other feedstocks (primarily manure). However, in recent years there has been an increase in usage, primarily from used straw, but also other agricultural residues. Still below 100,000 tonnes annually, and about 2% of all feedstock for biogas from all agricultural residues.</p>
5.ii	<p><i>Is the use of residue retention on land common practice as a mechanism for soil protection? Or required legally?</i></p> <p>Yes, it is a common practice, but not legally required. Land managers will certainly be aware of soil quality issues on their fields and moderate residue extraction if needed, as well as taking other steps to protect the soil such as adding other organic matter to the soil as required by local conditions.</p>
5.iii	<p><i>If residues are not used for bioenergy are there other existing uses of agricultural residues? (i.e. material uses)</i></p> <p>Straw use for bedding and feed for animals is the primary competing use for agricultural residues, and the only one of any consequence.</p> <p>There are small demonstration projects for waxes, creams made from straw. But these are at a very early demonstration stage. Small amounts. Experiments are being conducted on using straw for textile manufacturing, but again at an initial demonstration phase.</p>
5.iv	<p><i>What is the market infrastructure for the buying and selling of residues at present? (informal/local; coordinated/through traders or other points at which material is gathered together?)</i></p> <p>With regard to straw plants often have contracts directly with producing farmers. However, it is also often the case that distributors will sell collected straw to plants. Direct contracts are more common in the east, and distributors are more common in the west. This is mainly a result of historical patterns and habits.</p> <p>When straw is sold for animal feed this is typically done more informally between farmers.</p> <p>The Danish Straw Supply Association (DSSA - Danske Halmleverandører) has played an important role in the maturation of the Danish straw for energy market.¹⁷² In particular it managed to push its “codes of conduct” on straw price establishment with electricity companies. These among other things resulted in farmers setting their straw price offers for power companies and demonstrating that a sufficient amount of straw was available for the completion of the agreement. DSSA was also responsible for the establishment of basic criteria for straw supply tenders with electricity companies.</p> <p>Historically the price of straw and wood chips has followed each other closely with straw being 5–15% cheaper than wood chips on energy basis.¹⁶⁹</p> <p>Voytenko and Peck described the market operations of large CHP plants like this in 2012: “In the majority of cases straw is handled as big bales, which is considered to be the most cost-effective method. Straw delivery is organised in trucks with trailers, which unload bales at the plants. Contracts are established between the plant and farmers or farmer associations. Straw price is set in the contracts, and is a market price that is initially suggested by straw suppliers. The bottom ash from straw combustion is landfilled, treated or returned back to farmers and spread on the fields. In DK the contracts do not regulate the proportion of ash returned to the farmers, and thus its amount does not depend on the amount of straw delivered to the plant, which is considered to be imperfect.”</p>

¹⁷² Voytenko, Y., & Peck, P. (2012). Organisational frameworks for straw-based energy systems in Sweden and Denmark. *Biomass and Bioenergy*, 38, 34–48. <https://doi.org/10.1016/j.biombioe.2011.01.049>

5.v	<i>If residues are already being used for bioenergy feedstock, what is the sourcing area from which they are taken before the first processing step? (ie. are there details of how far the raw material is transported?)</i>
	<p>In terms of straw use, consumption is almost completely domestic sourcing, primarily quite close to the consuming plants, although larger plants will have a larger sourcing area. Typically, they will have specific supply contracts with particular farms, although sometimes also with distributors (primarily in Jutland).</p> <p>There is some small amount of export of straw to the Netherlands for agricultural use.</p> <p>For biogas, local farmers will use local residues. Larger plants will import residues from olive production in Spain for example or some straw pellets from Poland. There are intermediate suppliers as well as direct purchase.</p>

Legal requirements at national level – land management best practices

6.i	<i>Are rules in place determining the practices that should be applied on arable land (for non-perennial crops or cereals) to support soil quality? (if yes, please specify – FYI this could be legal requirements or requirements linked to funding such as under the CAP. Please briefly explain the measures and instruments that support them and how widely they are adopted (if non binding).</i>
	<p>There are rules limiting soil tillage in autumn before spring sown crops. The purpose is reduction of risk of N-leaching, though the rule has a positive effect to soil erosion as well.</p> <p>As other EU members We do have waste regulation that limits application of heavy metals, environmental compounds as PAH's aso – and fertilizer regulation that limits the application of nutrient. And a strong pesticide regulation.</p>
6.ii	<i>Please complete table a) below regarding support for management practices in country. Provide any comments on coverage in the box below</i>
6.iii	<i>How are measures for promoting soil quality monitored to ensure that land management practices comply with requirements? What evidence is used?</i>
	<p>Use of (analyzed and approved) waste products and pesticides are reported to The Danish Agricultural Agency every year. But no measurements of soil quality.</p> <p>There is surveillance of grazing areas by remote surveillance. Satellites and drones are used.</p>
6.iv	<i>How is compliance with measures to promote soil quality enforced?</i>
	A good soil quality is not yet defined – only as limit values for contaminants
6.v	<i>Does the country have access to/make use of remote sensing that would be able to differentiate crop type, type of land cover or proportion of land cover? What is the time horizon over which data is replicated (ie annual monitoring, once every 5 years? Etc) (if yes please describe briefly the systems in place, tools used etc)</i>
	<p>Absolutely. We use satellite measurements of biomass production and crop height and correlate it to the actual crops in the fields. The programs are CropSat and CropManager that use information about the actual crops from the planning program MarkOnline. The Danish Agricultural Agency are testing the programs for use as monitoring, testing catch crops and perennial grass management.</p>
6.vi	<i>Are there other forms of relevant monitoring or compliance rules that could be relevant to support evidence that measures are implemented?</i>
	Soil quality? Content and development of SOM? Soil density?

Table 29. Overview of the essential soil management practices referencing where rules are in place at the national level to support these practices

Requirement	Rules in place of relevance (description, scope)		Reference to legal text	Details of relevant compliance/monitoring approaches
	Y/N Partial	Description		
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	P	Actual legislation: Farms < 10 ha: No rules for minimum crops Farms 10-30 ha: Minimum 2 crops and minimum 10% catch crops – more if animal production (14%) or in N-sensible area. Farms > 30 ha: minimum 3 crops and catch crops	Guidance for Danish fertiliser and 'harmony' rules (<i>Vejledning om gødskningsog harmoniregler</i>) https://lbst.dk/fileadmin/user_upload/NaturErhverv/Filer/Landbrug/Goedningsregnskab/Vejledning_om_goedsknings-og_harmoniregler_i_planperioden_2019_2020_version2.pdf	Reporting required by farms of given size. Compliance check by Agriculture Agency. Inspection regime in place.
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	P	Actual legislation: Danish legislation contains 10-50% catch crops for farms above 10 ha and no tillage in autumn before spring sown crops. So it is implemented by law – except for the legumes in catch crops Use of Cruciferous, cereals, grass without clover, chicory and bluebell.	Guidance for Danish fertiliser and 'harmony' rules (<i>Vejledning om gødskningsog harmoniregler</i>) https://lbst.dk/fileadmin/user_upload/NaturErhverv/Filer/Landbrug/Goedningsregnskab/Vejledning_om_goedsknings-og_harmoniregler_i_planperioden_2019_2020_version2.pdf	Reporting required by farms of given size. Compliance check by Agriculture Agency. Inspection regime in place. See also 6.v for details on satellite monitoring.
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	N	Not a requirement. See Table b		
No burning of arable stubble except where authority has granted an exemption for plant health reasons¹⁷³.	Y	Implemented in DK. Only burning of grass stubble for seed is allowed	Executive Order on the Prohibition of Field Burning of Straw, etc. (<i>Bekendtgørelse om forbud mod markafbrænding af halm m.v.</i>) https://www.retsinformation.dk/eli/lta/2015/1459	
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity	N	Not a requirement. See Table b		

¹⁷³ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392

On farm land management best practices

7.i	<i>What tools are being made use of on farm to ensure soil quality is protected and soil carbon promoted? What is considered best practices, what is considered standard good practices?</i>
	A calculation sheet 'PlantePro' (developed from C-Tool, AU), can estimate the SOC-content over time, according to soil type, crops, yield, catch crop, crop residues and application of organic manure/slurry/sludge also. A good practise is increasing/levelled C-content in the soil and a Dexter-ratio above 10. But the tool is purely used and a new C-tool-model is in development. The Field planning program, MarkOnline will be extended with a soil C-balance.
7.ii	<i>Are there quality standards or best practices standards or labels, supply chain schemes that promote better soil quality or soil carbon as part of their requirements? If yes please provide details including the management practices covered</i>
	No.
7.iii	<i>Is crop rotation standard practices on farm (in particular those producing high residue crops such as cereals (including maize)? If so what crop rotations are being implemented?</i>
	Crop rotation is the standard practice in Denmark, and only a quite small area is cultivated with the same crop every year. 2. Winter wheat and 2. Winter rye is quite common, and maize for silage is also widely used in rotations with maize in 2 or three years followed by a rotational crop and grass.
7.iv	<i>Are cover crops standard practices on farm (in particular those producing high residue crops such as cereals (including maize)? If so what are they being used as (intercrops, winter crops etc) and are there strategies in place to limit bare soil?</i>
	Bare soil is only widely used on organic farms, while most of the other seed-rotations are either seeded with winter crops, or by catch crops either under sown in the main crop (typical in sandy soils), or established after harvest as cruciferous crops, followed by a spring crop the following year.
7.v	<i>Are legumes standard practices as part of crop rotations and cover cropping regimes?</i>
	Legumes are not a standard practice, but a lot of farmers would be happy to bring in more legumes, if prices were better, and yields were more stable. The area with horse beans have increased lately. In the catch-crops, the legumes are not allowed because of an estimated higher risk of N-leaching, as it is right now, but farmers hope that it will change very soon.
7.vi	<i>Are there standard practices adopted in terms of working of wet soils?</i>
	No.
7.vii	<i>What advisory services are in place or would be needed to support and promote the adoption of practices in table b?</i>
	Education in soil health, no-till and CA cropping. Farmer/advisor experience groups
7.viii	<i>What sources of information to demonstrate compliance would be held on farm or could be produced to meet compliance needs (see list in table 2)? Please briefly describe examples of evidence and what they could be used to demonstrate</i>
	Registration of praxis. Calculations of water balance and registration of dates for tillage and slurry application. Chosen application technique.

Table 30. Overview of the essential soil management practices referencing where it is known farmers are already implementing some aspects either as standard practice, or best practice

Requirement	Adopted as standard or best practice		What evidence might be used on farm to prove adoption?	Are there limits to potential application?
	Y/N Partial	Description of how and where is noted to be applied and what the drivers are for this		
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	P	Standard practice: Farms above 30 ha must have 3 crops and catch crops today, whereas farms of 10-30 ha must have 2 crops and catch crops. Why 5? – and why obligatory legumes?	Knowledge about effects of different species on soil fertility and diversity	Not relevant for small farms
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	Y	Standard practice: The Danish legislation already contains 10-50% catch crops for farms above 10 ha and no tillage in autumn before spring sown crops. So it is implemented by law – except for the legumes in catch crops		Legumes are not allowed in catch crops
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	P	<i>Improved drainage?/subsidies for drainage?</i> In wet soils Increased focus on avoiding traffic on wet soils and use of best technique. Light weight, low tire pressure, robot technology?. Use of Terranimo to calculate soil stress. Reduced tillage improves soil strength. No till as best practice, drivers are better soil structure, easier establishment. Subsidies for sowing machinery for reduced/no tillage	Lower use of fuel – climate effect Faster establishment Better soil structure and more insects Yield stabilization Subsidy for sowing machinery	From practice it seems that no till systems have a lower rate of success in wet soils than dry soils. Wet soils are cold, establishment weak and there are increasing challenges with slugs and weeds.
No burning of arable stubble except where authority has granted an exemption for plant health reasons¹⁷⁴.	Y	Standard practice: Already implemented in DK. Only burning of grass stubble for seed are allowed		
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity	Y	Standard practice Is in general adopted in Denmark. We measure field pH every 5-8 th year and apply lime when needed.		

¹⁷⁴ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392

Background information

List of references used during the case study:

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<https://doi.org/10.1016/j.biombioe.2017.11.015>
- Gregg, J. S., Bolwig, S., Solér, O., Vejlgård, L., Gundersen, S. H., Grohnheit, P. E., Herrmann, I. T. (Ed.), & Karlsson, K. B. (Ed.) (2014). *Experiences with biomass in Denmark*. DTU Management Engineering
- Gylling, M., Jørgensen, U., Bentsen, N. S., Kristensen, I. T., Dalgaard, T., Felby, C., ... Johannsen, V. K. (2016). *The + 10 million tonnes study: increasing the sustainable production of biomass for biorefineries*. (Updated edition 2016 ed.) Frederiksberg: Department of Food and Resource Economics, University of Copenhagen.
- Voytenko, Y., & Peck, P. (2012). Organisational frameworks for straw-based energy systems in Sweden and Denmark. *Biomass and Bioenergy*, 38, 34–48.
<https://doi.org/10.1016/j.biombioe.2011.01.049>

List of interviewees:

- **Bruno Sander Nielsen – Chief Operating Officer, Danish Biogas Association**
Discussion of use of agricultural residues in biogas.
- **Thomas Holst - Chief Policy Advisor**
Dept. for Sustainability, Environment and EU-affairs
Danish Agriculture & Food Council
& The Danish Straw Supply Association (DSSA - Danske Halmleverandører)
Information on use of straw in DK, regional differences, etc... Discussion on legal requirements for land use. Overview of the straw industry.
- **Troels Toft - Sector Director**
Sector for Crops
Danish Agriculture & Food Council F.m.b.A.
SEGES
Details on agricultural practices – section 6 & 7
- **Annette Vibeke Vestergaard**
Specialists on soil-quality, fertility and the use of Conservation Agriculture in Denmark
Danish Agriculture & Food Council F.m.b.A.
SEGES
Details on agricultural practices – section 6 & 7

Case study – Poland

Key Findings

The case study for Poland is based on analysis of Polish legislation and interviews with bioenergy and agricultural experts (See Appendix B). Agricultural residue volumes and end-use was assessed using statistical sources and academic publications (See References section).

Trading in domestic biomass (including straw) was fuelled in the past via support in the form of “green certificates” issued for bioenergy generation. However, policy changes have led to a fall in the value of “green certificates” and subsequent reduction in use of straw for bioenergy. As a result, the agricultural residue market is currently localised and very limited in scale. However, future renewable targets and changes resulting from RED II are likely to lead to increased use of agricultural residues for biomethane and biofuel production in the future.

This increases the risk of excessive removal of agricultural residues in the future. Sustainable farming practices can be implemented through a mix of national-level and farm-level solutions. Prevention of soil compaction and the prohibition on stubble burning is already in place as part of GAEC rules in Polish legislation. The on-going governmental review of these rules provides an opportunity to strengthen compulsory sustainability practices. Practices not covered under GAEC will have to be demonstrated at farm level through documentation of land use and additional auditing.

The demonstration of essential soil management practices implementation

Requirement	Level of demonstration	Evidence and monitoring system
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	Tier 2	Documentation on crop rotation and area used for CAP subsidy calculation.
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	Tier 2	Documentation on crop rotation and area used for CAP subsidy calculation.
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	Tier 1	Compliance with CAP subsidy requirements as monitored by ARiMR
No burning of arable stubble except where authority has granted an exemption for plant health reasons	Tier 1	Compliance with CAP subsidy requirements as monitored by ARiMR
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity	Tier 2	Self-declaration by the farmer

Introduction

Given the scale of its agricultural production, Poland produces a large amount of agricultural residue, including around 35Mt of straw every year. It is important that this by-product is used by farmers in a sustainable manner that does not affect the quality of agricultural soil.

The structure of Poland’s agricultural sector is highly diverse, and the sophistication of farming practices varies geographically and across different types of farm size. Larger and more advanced farms take a more pro-active approach to maintaining sustainability of agricultural soil, whilst smaller and often less educated farmers tend to be driven more by short-term economic drivers and less by long-term sustainability considerations.

Whilst legislation is in place to protect soil quality in Poland, its current focus is on the presence of pollutants and land recultivation, not on the carbon content of agricultural soil. Crop rotation and agricultural residue removal is considered as part of the Good Agricultural and Environmental Conditions (GAEC) which are tied to the payment of farmer subsidies under the EU's CAP. In practice, there are currently limited sources of demand for straw as it is currently not highly competitive for bioenergy production. This was not the case in the past when "green certificates" for bioenergy production rewarded the use of straw (and other biomass) more generously than today.

GAEC rules are currently being reviewed for the EU's next financial framework 2021-2027. Experts expect that the Government will extend and strengthen the set of GAEC rules to better protect soil quality and improve agricultural sustainability. Some of the higher sustainability standards currently required under the "Sustainable Agriculture" and "Water and Soil Protection" programmes (in which farmers receive additional EU subsidies) may be moved to the compulsory set of GAEC rules.

Given the lack of alternative uses for agricultural residues, the majority of straw is currently incorporated into the soil. Most farmers view this as a lower-cost alternative to the use of fertilizers, also given the lack of manure in many areas. Other typical farming practices include two- or three-crop rotations and the use of cover crops in mountainous or erosion-prone land. Farming practices vary significantly across farms and depend on farm size and sophistication of agricultural production (including available farming equipment).

Given the growing interest in bioenergy in Poland, the country's future straw balance may look very different than today. Increasing need for biomethane in transport and heating may cause an increase in the use of straw in anaerobic digestion. Large energy players are also investing in biofuel production facilities which may run on straw and create another source of future demand for agricultural residues.

It is therefore important that there are appropriate rules for agricultural residue management and other farming practices that protect the quality of agricultural soils. Poland has well-developed monitoring and advisory institutions that can facilitate the introduction of such standards and future-proof the agricultural sector amid potential competing uses for agricultural residues.

Background questions

1.	<i>Please indicate which region/location is looked at.</i>
	Poland
2.	<i>Please indicate in 1-2 sentences why this region is of interest for this specific case study.</i>
	Poland is a significant agricultural producer in Europe. Given the scale of cereal production, Poland produces significant amounts of agricultural residue in the form of straw, estimated at around 35Mt per year. Main sources of straw are crops of winter wheat (7.6Mt), maize (5.88Mt), triticale (4.5Mt) and winter rye (3.9Mt). (See reference number 6)
3.	<i>Please indicate if there are specific boundary conditions you want to mention.</i>
	n/a
4.	<i>Please indicate the make-up of the farming sector in the country under consideration i.e. average farm size, productivity, extent of organic production, intensive vs extensive management etc. Are there regional differences in the scale of farms?</i>
	Poland's farming sector differs across geographies. Whilst the average farm size was 10.3ha in 2016, farms tend to be larger in the North and West of the country and smaller in the South-east. 99.8% of farms had arable land (84% had crop land) and 51% had farm animals. In terms of land used for crops, 70% of surface area was used for cereals, 10.2% industrial crops (e.g. rapeseed), 10.2% fodder plants, 3% legumes and 3% potatoes. The most important cereals were winter wheat (40% of farms), winter triticale (34.2%), spring barley (26%) and spring cereal mixes (25.3%). The share of farms growing intensive cereals (wheat, barley and triticale) has increased from 61% in 2013 to 70% in 2016. (1)

Poland, along with other Eastern European countries, has a relatively large yield gap estimated at around 50-60% of yield potential. (8)
Average annual income of a farm household was €17,700 in 2016. For 34% of all farms, farming was the main source of income – these farms recorded a higher income of €36,600 in 2016. (1)

Understanding soil protection baselines

To check whether the sustainable production criteria is met, the following questions are the main focus of this section based on the five sub-criteria previously outlined:

4.i	<i>Is legislation in place to protect soil quality and soil carbon? (if yes, please briefly reference and describe this)</i>
	Farmers receiving agricultural subsidies need to comply with the Good Agricultural and Environmental Conditions (GAEC) which have been adopted in the Agriculture Minister's ordinance in 2010. (2) The Act on the Protection of Agricultural and Forest Land lays down principles of protection of agricultural and forest land, recultivation and improvement of land quality. Agricultural lands are protected by: limitation of their allocation for other purposes; prevention from degradation and devastation; recultivation; and preservation of peat areas and natural water reservoirs. (4) Section IV of the Environmental Protection Act contains rules on the protection of soils. Article 101 states that soil needs to be protected to maintain its productive purposes and as a carbon reservoir. Soil quality should be ensured by protecting it from erosion, compaction, salination and acidification and by maintaining soil humus concentration. (3)
4.ii	<i>Is soil quality and/or soil carbon/soil organic carbon defined in legislation in the country? (if yes, please briefly reference and describe this)</i>
	Good soil quality is defined through the maximum concentration of various pollutants allowed in soil, depending on type of land and depth. These standards were defined in the Environment Minister's Regulation nr 1359 from 9th September 2002 .
4.iii	<i>What mechanisms are there in place in country to monitor soil quality?</i>
	The Chief Inspectorate of Environmental Protection (GIOS) monitors agricultural soil quality (the chemical composition of soil) in a 5-year cycle across a network of 216 measuring stations located on agricultural land across Poland.
4.iv	<i>Are land managers required to develop soil management plans or similar? (if yes, please explain their specification/coverage)</i>
	According to Article 16 of the Act on the Protection of Agricultural and Forest Land, management plans need to be prepared for agricultural land located in limited use areas, located around industrial facilities. The land management plans are prepared at the expense of the industrial facility owner and covers: type of pollutants and their concentration, impact of pollution on land use and productivity, current production type on the land, ways of preventing the degradation of soil, expected agricultural yield, etc.
4.v	<i>Are rules in place to limit residue extraction linked to agricultural crops?</i>
	The Good Agricultural and Environmental Conditions (GAEC) have been adopted in the Agriculture Minister's ordinance (Dz. U. Nr 39, poz. 211, z późn. zm.) in 2010. These specify that agricultural residue needs to be incorporated into the soil after three years of crop monoculture, or else, crops need to be rotated (see 6.i).
4.vi	<i>Are incentives or rules in place promoting the use of agricultural residues for bioenergy? (if yes please briefly reference and describe)</i>
	Indirect incentives are for the generation of electricity from biomass and biogas. Biomass and biogas plants can participate in auctions for renewable support. Alternatively, biogas plants can choose to receive "blue certificates" for the energy they produce. "Blue certificates" have a market value and are traded on the Polish Power Exchange (www.tge.pl). Despite renewable auctions, there hasn't been much investment in dedicated plants for biomass or biogas because of a low reference price, unstable regulatory environment, high risk perception from lenders, lack of guaranteed offtake prices for biomethane (there are currently only guaranteed prices for renewable power).

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Understanding use of agricultural residues/residue market

5.i	<p><i>Is there evidence of use of agricultural residues already within the bioenergy sector? (if yes for what purposes and to what extent)</i></p> <p>In general, the use of straw for bioenergy production is limited. Straw can be used in solid form as biomass. In 2016 around 2.6Mt (7% of total) of straw (in the form of pellets) was used in power plants but since then the use of biomass has roughly halved (and use of straw has become negligible) due to the lower value of “green certificates” and competition from wood pellets and biomass imports from other regions (Ukraine, Africa).</p> <p>Some straw mixed with manure is used for biogas generation. This is currently at a small-scale and localised. Biogas production may increase in the future due to growing demand in the transport sector which is leading to gradual restructuring of the market.</p> <p>ORLEN has obtained a license to build a 25kt cellulosic ethanol plant using agricultural residues) in south eastern Poland (Podkarpacie region)¹⁷⁵. The plant will require around 150kt feedstock (likely cereal straw) annually, and so the facility has the potential to significantly change the regional straw balance. It is unclear whether feedstock will also be imported from Ukraine.</p>
5.ii	<p><i>Is the use of residue retention on land common practice as a mechanism for soil protection? Or required legally?</i></p> <p>Yes, straw is incorporated into the soil in order to maintain proper soil quality. Around 13.5Mt (38%) is reported to be ploughed into the soil every year. However, the figures may be higher than this due to limited alternative uses for straw. (6)</p> <p>There is a difference between farm type: smaller farms will incorporate more straw into the soil given the lower cost of using straw compared to fertilizers. Larger farms are more likely to bail some of the straw and remove it from the land. Whether a farm maintains farm animals also impacts the amount of residue retention.</p>
5.iii	<p><i>If residues are not used for bioenergy are there other existing uses of agricultural residues? (i.e. material uses)</i></p> <p>Straw is also used for animal bedding (depending on source 5.3-10Mt per annum), animal feed (depending on source 3.5-5.6Mt per annum) and as a substrate for mushroom cultivation (around 1Mt per annum). At a smaller scale, demand for straw pellets also comes from large horse farms, domestic pet shops, as well as import demand from other countries.</p>
5.iv	<p><i>What is the market infrastructure for the buying and selling of residues at present? (informal/local; coordinated/through traders or other points at which material is gathered together?)</i></p> <p>Straw is traded through intermediaries and marketed via online exchanges. The market is small and fragmented with no dominant players. Straw can be purchased in the form of pellets in limited quantities (max. 5-15kt). The high cost of transporting straw pellets limits the commercial viability of straw trade over long distance.</p>
5.v	<p><i>If residues are already being used for bioenergy feedstock, what is the sourcing area from which they are taken before the first processing step? (ie. are there details of how far the raw material is transported?)</i></p> <p>The straw balance is regionally very diverse. There tends to be a surplus in the North-West where farms tend to be larger and agriculture is less diverse (less animal farming) so end-use demand for straw is limited.</p>

Legal requirements at national level – land management best practices

6.i	<p><i>Are rules in place determining the practices that should be applied on arable land (for non-perennial crops or cereals) to support soil quality? (if yes, please specify – FYI this could be legal requirements or</i></p>
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¹⁷⁵ <https://www.clariant.com/en/Corporate/News/2019/09/Clariant-and-ORLEN-Poudnie-announce-license-agreement-on-sunliquidreg-cellulosic-ethanol-technology>

	<i>requirements linked to funding such as under the CAP. Please briefly explain the measures and instruments that support them and how widely they are adopted (if non binding).</i>
	<p>These are included in the Good Agricultural and Environmental Conditions (GAEC) which have been adopted in the Agriculture Minister's ordinance (Dz. U. Nr 39, poz. 211, z późn. zm.) in 2010. Adhering to GAEC is a crucial condition for farmers obtaining subsidies under the CAP.</p> <p>Wheat, rye and barley cannot be cultivated longer than 3 years. This period can be extended to 5 years if before the fourth and fifth year of sowing, straw or manure is incorporated into the soil.</p> <p>Farmers can also apply to obtain additional subsidies under the "Sustainable Agriculture" and "Water and soil protection" programme funded under the CAP. Payments from these programmes are tied to stricter farming practices, including requirement for three different crops over a 5 year period or use of cover crops.</p>
6.ii	<i>Please complete table a) below regarding support for management practices in country. Provide any comments on coverage in the box below</i>
6.iii	<i>How are measures for promoting soil quality monitored to ensure that land management practices comply with requirements? What evidence is used?</i>
	<p>The Agency for Restructuring and Modernisation of Agriculture (ARiMR) is responsible for farming subsidy payments and monitoring that all requirements (incl. GAEC) are fulfilled. ARiMR controls around 4% of farms per year either by in-person inspection or satellite pictures. In-person controlling is done through the agency's employees or subcontractors.</p> <p>In-person inspections include interviews (questions about fertiliser use, manure management, etc.), field inspections and measuring surface areas with GPS technology.</p>
6.iv	<i>How is compliance with measures to promote soil quality enforced?</i>
	ARiMR is responsible for paying out farming subsidies and can decide to withhold these if GAEC requirements are not met.
6.v	<i>Does the country have access to/make use of remote sensing that would be able to differentiate crop type, type of land cover or proportion of land cover? What is the time horizon over which data is replicated (i.e. annual monitoring, once every 5 years? Etc) (if yes please describe briefly the systems in place, tools used etc)</i>
	The Polish government is starting to use new technologies (satellite imaging, photomaps made from planes and using drones) to control farms – although this is not widely applied yet (perhaps more established in 5-10 years' time).
6.vi	<i>Are there other forms of relevant monitoring or compliance rules that could be relevant to support evidence that measures are implemented?</i>
	No.

Table 31. Overview of the essential soil management practices referencing where rules are in place at the national level to support these practices

Requirement	Rules in place of relevance (description, scope)		Reference to legal text	Details of relevant compliance/ monitoring approaches
	Y/N Partial	Description		
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	N			
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	N			
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	Y	Tillage operation with heavy vehicles is forbidden on wet soils under par. 3.2 of the Agriculture Minister's ordinance. Article 101, Point 4 of the Environmental Protection Act requires that soil is protected from soil compaction.	Ordinance: Dz. U. Nr 39, poz. 211, z późn. zm. http://www.fao.org/faolex/results/details/en/c/LEX-FAOC060001/	
No burning of arable stubble except where authority has granted an exemption for plant health reasons¹⁷⁶.	Y	Burning of arable land is forbidden under par. 3.1 of the Agriculture Minister's ordinance.	Dz. U. Nr 39, poz. 211, z późn. zm.	
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity	N			

¹⁷⁶ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392

On farm land management best practices

7.i	<i>What tools are being made use of on farm to ensure soil quality is protects and soil carbon promoted? What is considered best practices, what is considered standard good practices?</i>
	Agricultural residues tend to be incorporated into the soil on most farms, particularly smaller farms which find it more cost-effective than the use of fertilisers. Large farmers are more sophisticated in that they take soil samples to measure soil quality, in particular, nitrogen concentration to decide the amount and quality of fertiliser to be applied.
7.ii	<i>Are there quality standards or best practices standards or labels, supply chain schemes that promote better soil quality or soil carbon as part of their requirements? If yes please provide details including the management practices covered</i>
	No, such standards or labels do not currently exist.
7.iii	<i>Is crop rotation standard practices on farm (in particular those producing high residue crops such as cereals (including maize)? If so what crop rotations are being implemented?</i>
	Crop rotation depends on type of farm production and soil quality. A three-crop rotation is most typical in the following cycles: cereal-cereal-other crop (typically rapeseed, maize or buckwheat). On high quality soil, winter wheat and rapeseed are rotated. Triticale (wheat and rye hybrid) and maize is also used as a typical crop rotation.
7.iv	<i>Are cover crops standard practices on farm (in particular those producing high residue crops such as cereals (including maize)? If so what are they being used as (intercrops, winter crops etc) and are there strategies in place to limit bare soil?</i>
	Cover crops are used in mountainous areas and land prone to erosion (around 30% of all agricultural land has been classified by the Agricultural Ministry as at threat of erosion). Cover crops are also applied after specific crops, e.g. rapeseed. Typical cover crops are lucerne, shamrock, mixes of grass and shamrock, field peas, etc. Straw in the form of mulch is also used to protect bare soil.
7.v	<i>Are legumes standard practices as part of crop rotations and cover cropping regimes?</i>
	Legumes are used in crop rotations and as intercrops. However, legumes constitute only 4% of total crops so their role is limited. Field peas, lucerne and lupines are typical legumes used in agriculture.
7.vi	<i>Are there standard practices adopted in terms of working of wet soils?</i>
	Farmers will typically avoid farming on arid or wet soils. Their capability to manage soil compaction depends on availability of equipment, e.g. seedbed cultivators which reduce the number of rounds vehicles make on the land.
7.vii	<i>What advisory services are in place or would be needed to support and promote the adoption of practices in table b?</i>
	Each administrative region (województwo) has an advisory centre which provides free-of-charge education, information and advisory services for farmers. There are 16 of such "agricultural advice centres".
7.viii	<i>What sources of information to demonstrate compliance would be held on farm or could be produced to meet compliance needs (see list in table 2)? Please briefly describe examples of evidence and what they could be used to demonstrate</i>
	Farmers will gather information about type of crops, land area, fertilizer use,

Table 32. Overview of the essential soil management practices referencing where it is known farmers are already implementing some aspects either as standard practice, or best practice

Requirement	Adopted as standard or best practice		What evidence might be used on farm to prove adoption?	Are there limits to potential application?
	Y/N Partial	Description of how and where is noted to be applied and what the drivers are for this		
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	Partial	A 3-crop rotation is currently most typical.	Documentation on land use and crop type as required by the farmer subsidy payment agency (ARiMR).	
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	Partial	Catch/intermediary crops are sowed but the use of legumes is limited.	As above.	
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	Partial	Farmers' ability to avoid soil compaction will depend on the type of equipment they have that can reduce tillage or number of field operations.		Application of best practices will be limited by the type of equipment that farmers own.
No burning of arable stubble except where authority has granted an exemption for plant health reasons¹⁷⁷.	Y			
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity	Partial	Larger and/or more sophisticated farmers do apply liming, whilst other farmers do not. Farmers smaller than 70ha can apply for subsidies for up to 50% of cost of lime.		

¹⁷⁷ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392

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List of interviewees:

- Prof. Mariusz Matyka, IUNG Pulawy
- Adam Stepień, Polish Chamber of Biofuels
- Delfina Rogowska, Biomass Certification Systems Office
- Prof. Grzegorz Siebielec, IUNG Pulawy

Case study – Ukraine

Key Findings

The case study for Ukraine is based on a literary analysis of publications of the National Academy of Agrarian Sciences and specialized universities, publication of articles and interviews with farmers on specialized web platforms and the analysis of the Ukrainian legislation. There were also interviews with practicing farmers, who represent the two most common forms of agricultural enterprises in Ukraine: medium-sized farms and large Agro Holdings. The energy sector of agricultural residues was analyzed on the basis of available statistics, publications of profile associations and interview with the producer of straw pellets. Coverage of information allows indicating the high reliability of the study results.

Residue market in Ukraine is not well developed. Currently consumers (pellet producers and small boiler houses) enter into direct contracts with suppliers of agricultural residues. With the future development of bioenergy according to the national goals set up in the Energy Strategy of Ukraine and the Concept of the Green Transition the involvement of agricultural residues into the energy balance will heavily increase. There is a proposition of Bioenergy Association of Ukraine to establish of the biofuel electronic trading system (BETS). BETS is intended to provide transparent and market-oriented ways of biomass trading and non-discriminatory and competitive way to incentivize both supply and demand sides of the emerging biomass market.

The essential soil management practices application mostly should be proven at the farm level. Relevant recommendations exist, but their compliance is not monitored. Only burning of the arable straw is prohibited and monitored at the national level.

The demonstration of essential soil management practices implementation

Requirement	Level of demonstration	Evidence and monitoring system
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	Tier 2	Self-declaration by the farmer + Independent third-party auditor
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	Tier 2	Self-declaration by the farmer + Independent third-party auditor
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	Tier 2	Self-declaration by the farmer + Independent third-party auditor
No burning of arable stubble except where authority has granted an exemption for plant health reasons	Tier 1	The open data on bringing individuals to administrative responsibility for burning stubble
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity	Tier 2	Self-declaration by the farmer + Independent third-party auditor

Introduction

According to experts, in the coming years, Ukraine may increase the production of grain and oilseed crops to 100 Mt per year. Thus, we can state that the country has steadily high production volumes of main crops with the prospect of further growth, which is a big source of various types of residues and

by-products. With this approach, the potential of agribiomass can increase from the current 9 Mtoe/yr to 11.3 Mtoe/yr.

Legislative acts do exist in Ukraine to encourage enterprises to adopt environmentally sustainable rational approaches in agriculture production (e.g. the white documents expressing Land, Water and Air Codes in addition to laws on Environmental Protection, Land Protection, Protection of Atmospheric Air etc.). Thus, in terms of land use, the Land Code of Ukraine (Land Code, 2002) and the Law of Ukraine on Land Protection (Land Law, 2003) specify the main measures for the economic stimulation of the protection and use of land and the increase of soil fertility by landowners and land users. However, at the same time, the practical implementation of the measures is restrained by the lack of a legally established procedure.

There are no legal restrictions for the residues extractions. Farmers decide on the possibility of removing residues based on their own practices, the amount of applied organic and mineral fertilizers, the demand for this type of raw material. Only 3% of the total energy potential of the grain crops straw was utilized in 2017. The share of the utilization of stalks and cobs of corn was at the level of 0.1%. Agricultural residues are already used for pellets and briquettes production and for thermal energy production (straw bales). The residues market is currently formed by several large producers of pellets and boilers for periodic combustion of large bales of straw.

Recommendations on crop rotation system, prevention of soil compaction and application of liming on acidic soils are provided, but their compliance is not verified at the national level. There is only a mechanism to control and bring to administrative responsibility for arable stubble burning. Therefore, confirmation at Tier 1 level is currently not possible in Ukraine.

The farm approach on essential soil management practices implementation depends on farm location, the level of technical equipping, the availability of working capital, the level of awareness of the chief agronomist, conjuncture of prices for crop production (high impact) and other factors. Some practices are more commonly used, such as preventing soil compaction, liming, and no burning of arable stubble, while the use of 5-crop rotation and cover crops is somewhat limited. In general, the situation is improving and more and more farmers are implementing these recommendations as standard farming practices.

Current practice of using agricultural lands that are leased (for many years in Ukraine there was a moratorium on the sale of agricultural land) is not conducive to long-term planning of soils fertility and using of the best soil management practices. The situation may change with the opening of the land market that is scheduled for July 1, 2021. Additionally, Ukraine's Energy Strategy sets an ambitious goal of reaching 11 Mtoe of biomass, biofuels and waste in the total primary energy supply by 2035. The Concept of Ukraine's green energy transition until 2050 implies the rejection of coal generation by 2050. Wide involvement of solid agribiomass in fuel and energy complex of the country is an important prerequisite for achieving national bioenergy targets taking into account that share of utilization of the woody biomass potential is almost 100%.

Climate change is also forcing farmers to rethink their approaches to management practices, such as tillage. International projects (FAO), the National Academy of Agricultural Science, Universities and companies that offer modern agricultural technologies provide consulting support of farmers. They are also supported by the International financial organizations and agro-industrial development departments of the authorities.

Background questions

1.	<i>Please indicate which region/location is looked at.</i>
	Ukraine
2.	<i>Please indicate in 1-2 sentences why this region is of interest for this specific case study.</i>
	Ukraine is a big agrarian country and is one of the five largest exporters of cereals in the world. Biomass of agrarian origin (straw of grain crops and rape, by-products of grain corn and sunflower production, sunflower husk) remains the main component of the biomass energy potential in Ukraine. According to 2017 data, the economic potential of these types of biomass available for energy production is almost 9 Mtoe, which is 43% of the total biomass potential (20.9 Mtoe).
3.	<i>Please indicate if there are specific boundary conditions you want to mention.</i>
	Ukraine is an associated member of the European Union and the member of the Energy Community. The agricultural capacity of Ukraine is concentrated in the steppe and forest-steppe zones.
4.	<i>Please indicate the make-up of the farming sector in the country under consideration ie average farm size, productivity, extent of organic production, intensive vs extensive management etc. Are there regional differences in the scale of farms?</i>
	There are two main groups of agricultural producers in Ukraine: first is medium-sized agricultural enterprises with a land area of 1 to 3 th. hectares, and the second is large farms with an area of more than 7,000 hectares. Together, these two groups of farms account for 62.7% of the total area of agricultural land used in agricultural production [1]. A dualistic farming structure is a key feature of the agricultural sector in Ukraine. Many smaller farms operate in parallel with a much smaller number of large farms. Partly these large farms are subsidiaries of agroholdings [2]. Agroholding farms are comparably more productive in terms of output per input unit such as per ha. They have relatively high profitability due to a vertically integrated structure, intensive management and implementation of new technologies. Ukraine has 381 thousand hectares of organic lands occupying the 11 th place in Europe according to this indicator. However, it's only 1% of the total volume of agricultural lands [3]. Big agroholding farms are concentrated in the central, east and south parts of Ukraine in the steppe and forest-steppe zones; small farms are located mostly in the west and north (Polissia) due to landscape characteristics.

Understanding soil protection baselines

To check whether the sustainable production criteria is met, the following questions are the main focus of this section based on the five sub-criteria previously outlined:

4.i	<i>Is legislation in place to protect soil quality and soil carbon? (if yes, please briefly reference and describe this)</i>
	Articles 35, 36, 37 of the Law of Ukraine "On land protection" set up rules for the land protection during agricultural activities and define basic requirements for soil fertility protection.
4.ii	<i>Is soil quality and/or soil carbon/soil organic carbon defined in legislation in the country? (if yes, please briefly reference and describe this)</i>
	The Law of Ukraine "On land protection" provides definitions for: humus as an organic component of the soil, which is formed in the process of biochemical decomposition of plant and animal remains and forms its fertility; soil fatigue - violation of the bioenergetic regime of soils and a sharp decrease in crop yields due to their constant cultivation or frequent return to the previous field of crop rotation, which leads to deterioration of soil quality, accumulation of specific pathogens and weed seeds in soils; soil degradation - deterioration of useful properties and soil fertility due to the influence of natural or anthropogenic factors; Soil fertility - the ability of soil to meet the needs of plants in nutrients, water, air and heat in sufficient quantities for their normal development, which together are the main indicator of soil quality.
4.iii	<i>What mechanisms are there in place in country to monitor soil quality?</i>
	According to the Regulations on soil quality monitoring on agricultural lands (https://zakon.rada.gov.ua/laws/show/z0383-04) the monitoring is conducted by the analysis of archival data fund, soil surveys, agrochemical land passportization, functioning of the network of stationary and field plots experiments, remote sensing usage etc.

4.iv	<i>Are land managers required to develop soil management plans or similar? (if yes, please explain their specification/coverage)</i>
	Crop rotation control system was cancelled recently due to the deregulation strategy of the government. Thus, the requirement to develop the land management projects that provide ecological and economic justification for crop rotation and land management is under amending now.
4.v	<i>Are rules in place to limit residue extraction linked to agricultural crops?</i>
	There are official recommendations “The use of straw and crop residues as organic fertilizers to improve the humus condition of soils” of the Ministry of Agriculture of Ukraine developed by research institutions of the National Academy of the Agrarian Science of Ukraine [4]. 40-45% of agricultural residues is recommended to use as an organic fertilizers.
4.vi	<i>Are incentives or rules in place promoting the use of agricultural residues for bioenergy? (if yes please briefly reference and describe)</i>
	No separate incentives to promote the use of agricultural residues for energy purposes [5]. Feed-in tariff for electricity production and special “stimulating” tariff for thermal energy production from biomass are the main supporting mechanisms for bioenergy development in Ukraine.

Understanding use of agricultural residues/residue market

5.i	<i>Is there evidence of use of agricultural residues already within the bioenergy sector? (if yes for what purposes and to what extent)</i>
	Agricultural residues (mostly straw) are already used for pellets and briquettes production and for thermal energy production (straw bales). In addition, there is one example of thermal energy production from corn cobs. According to the estimates of UABIO experts, only 135 ktoe was used in 2017 within the bioenergy sector [5]. Straw pellets were produced in the amount of 155 kt, and 200 kt of straw bales were combusted for energy production.
5.ii	<i>Is the use of residue retention on land common practice as a mechanism for soil protection? Or required legally?</i>
	Residue retention is a common practice for soil protection if a farmer uses the technologies for the minimum soil tillage. These technologies are widely spread in Ukraine: mini/minimum tillage preparation technology was used on 80% of crop lands in 2009 [7].
5.iii	<i>If residues are not used for bioenergy are there other existing uses of agricultural residues? (i.e. material uses)</i>
	Residues are only used in the agricultural sector: as a litter and feed in livestock production, as a substrate for growing mushrooms at the warehouses.
5.iv	<i>What is the market infrastructure for the buying and selling of residues at present? (informal/local; coordinated/through traders or other points at which material is gathered together?)</i>
	Residues are sold through direct contracts between farmers and consumers. Big pellets producers own all necessary equipment to organize the collection and transportation of residues from the field to the production facility [6]. Small boiler houses, which use big straw bales for thermal energy production in boilers of periodic combustion, buy the bales from farmers who provide straw harvesting. To date, the biofuel market in Ukraine remains poorly developed.
5.v	<i>If residues are already being used for bioenergy feedstock, what is the sourcing area from which they are taken before the first processing step? (ie. are there details of how far the raw material is transported?)</i>
	Two biggest boiler houses that use (square) straw bales as a fuel (10 MW boiler house in Nikopol town and 1 MW boiler house in Myrgorod town) has the sourcing radius of 15-25 km [8]. Big pellets producers (Aver-Tech, Uman town and Vin-Pelleta, Turbiv town) with annual pellets production at the level of 10-30 kt transport the feedstock within the 50 km radius.

Legal requirements at national level – land management best practices

6.i	<i>Are rules in place determining the practices that should be applied on arable land (for non-perennial crops or cereals) to support soil quality? (if yes, please specify – FYI this could be legal requirements or requirements linked to funding such as under the CAP. Please briefly explain the measures and instruments that support them and how widely they are adopted (if non binding).</i>
	Normative standards for crops rotation in different natural and agricultural regions (https://zakon.rada.gov.ua/laws/show/164-2010-%D0%BF) are in force in Ukraine. The standards are obligatory for organic products producers, but they are voluntary for other agriculture producers.
6.ii	<i>Please complete table a) below regarding support for management practices in country. Provide any comments on coverage in the box below</i>
	National legislation in Ukraine envisages several management practices to support soil quality, although most of them are voluntary.
6.iii	<i>How are measures for promoting soil quality monitored to ensure that land management practices comply with requirements? What evidence is used?</i>
	Documentary evidence is mainly used to prove that land management practices were realised.
6.iv	<i>How is compliance with measures to promote soil quality enforced?</i>
	The compliance with measures is enforced by the state control that is provided according to the Law of Ukraine “On state control over land use and protection” (https://zakon.rada.gov.ua/laws/show/z1321-18). The Law envisages the legal grounds for inspections conducting and bringing to responsibility.
6.v	<i>Does the country have access to/make use of remote sensing that would be able to differentiate crop type, type of land cover or proportion of land cover? What is the time horizon over which data is replicated (ie annual monitoring, once every 5 years? Etc) (if yes please describe briefly the systems in place, tools used etc)</i>
	In 2019, Ukraine and the World Bank, with EU financial support, has launched a pilot project for satellite monitoring of agricultural land under the global 5-year Land Transparency Program to improve the transparency and efficiency of land asset management in Ukraine. Currently, the project has been implemented in three regions of Ukraine: Lviv, Kyiv and Mykolaiv. Based on space monitoring data, an analysis of the vegetation layer of the earth's surface was conducted, which allowed to create maps of crops, determine the exact boundaries of fields, as well as identify major types of coverage. The detailed map has been created: https://eos.com/cropmap/?utm_source=Liga&utm_medium=pr&utm_campaign=cropmap
6.vi	<i>Are there other forms of relevant monitoring or compliance rules that could be relevant to support evidence that measures are implemented?</i>
	The law “On Land Protection” states that in order to control the dynamics of soil fertility, their agrochemical inspection is carried out systematically, agrochemical passports are issued, which record the initial and current levels of soil nutrient supply and levels of soil pollution. Agrochemical certification of arable land is carried out every 5 years, hayfields, pastures and perennials - every 5-10 years and is mandatory for all landowners and land users.

Table 33. Overview of the essential soil management practices referencing where rules are in place at the national level to support these practices

REDIIBIO project

Requirement	Rules in place of relevance (description, scope)		Reference to legal text	Details of relevant compliance/ monitoring approaches
	Y/N Partial	Description		
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	Partial	Permissible standards for the frequency of cultivation on the same field vary from 1 year to 10 years for different crops.	Normative standards for crops rotation in different natural and agricultural regions https://zakon.rada.gov.ua/laws/show/164-2010-%D0%BF	Standards are voluntary for agriculture producers. The monitoring is not applied
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	No			
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	Partial	There are recommendations from Institute of Agriculture of NAAS of Ukraine and other scientific organisations only.	http://agro-business.com.ua/agro/ahronomiia-sohodni/item/11195-borotba-z-pereushchilnenniam-hruntiv.html	N/a
No burning of arable stubble except where authority has granted an exemption for plant health reasons.	Yes	Burning of stubble, meadows, pastures, areas with steppe, wetland and other natural vegetation, vegetation or its remains and fallen leaves on agricultural lands is prohibited. Administrative liability for these actions is foreseen.	Administrative Code of Ukraine as of 7 December, 1984 https://zakon.rada.gov.ua/laws/show/80731-10	State Ecological Inspectorate of Ukraine provides control and monitoring.
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity	Partial	Liming is considered as a part of chemical land-reclamation. It can be used to improve the physico-chemical and physical quality of soils, their chemical composition.	Law of Ukraine "On Land reclamation" as of 14 January, 2000 https://zakon.rada.gov.ua/laws/show/1389-14	Ministry for Economic Development, Trade and Agriculture is responsible for land-reclamation organization.

On farm land management best practices

7.i	<i>What tools are being made use of on farm to ensure soil quality is protects and soil carbon promoted? What is considered best practices, what is considered standard good practices?</i>
	Plowing is considered a standard practice. The best practice is the combination of minimal tillage with plowing and application of organic fertilizers.
7.ii	<i>Are there quality standards or best practices standards or labels, supply chain schemes that promote better soil quality or soil carbon as part of their requirements? If yes please provide details including the management practices covered</i>
	There are no standards. Farmers use the recommendations of seed suppliers, the department of agro-industrial regional state administration and district state administration. Agronomists are undergoing internships. Farmers take into account the experience of the best farms and the recommendations of scientists and practitioners.
7.iii	<i>Is crop rotation standard practices on farm (in particular those producing high residue crops such as cereals (including maize)? If so what crop rotations are being implemented?</i>
	Crop rotation is a standard practice. From 5 to 10 crop rotation system is used.
7.iv	<i>Are cover crops standard practices on farm (in particular those producing high residue crops such as cereals (including maize)? If so what are they being used as (intercrops, winter crops etc) and are there strategies in place to limit bare soil?</i>
	Cover crops are not used due to lack of moisture.
7.v	<i>Are legumes standard practices as part of crop rotations and cover cropping regimes?</i>
	Legumes are grown (mostly peas).
7.vi	<i>Are there standard practices adopted in terms of working of wet soils?</i>
	Agrarians do not work on the wet soils.
7.vii	<i>What advisory services are in place or would be needed to support and promote the adoption of practices in table b?</i>
	There are consultants from the companies that sell seeds, and from departments at the authorities.
7.viii	<i>What sources of information to demonstrate compliance would be held on farm or could be produced to meet compliance needs (see list in table 2)? Please briefly describe examples of evidence and what they could be used to demonstrate</i>
	Field maps, photos and invoices for the purchase of seeds can be used to demonstrate compliance.

Table 34. Overview of the essential soil management practices referencing where it is known farmers are already implementing some aspects either as standard practice, or best practice

Requirement	Adopted as standard or best practice		What evidence might be used on farm to prove adoption?	Are there limits to potential application?
	Y/N Partial	Description of how and where is noted to be applied and what the drivers are for this		
At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	Partial	Corn and silage corn, winter wheat, winter and spring barley, peas, soybeans, alfalfa, sunflower, winter and spring rape and sugar beets.	Cartograms, photographs, invoices for the purchase of seeds	Focus on proven practices and rainfall
Sowing of cover/catch crops/intermediary crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	No			Moisture deficiency for cover crops
Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; controlled traffic planning can be used).	Yes	Minimize movement on moist soil. The fields are in the zone of insufficient moisture.		
No burning of arable stubble except where authority has granted an exemption for plant health reasons¹⁷⁸.	Yes	We do not practice burning plant remains in the field. Straw is collected for livestock, briquette production and for sale.	Invoices for the sale of briquettes and straw. Photographs	The amount of straw extraction depends on the available amount of organic waste that will be used to fertilize the fields
On acidic soils that liming is applied, where soils are degraded and acidification impacts on crop productivity	Yes	If necessary, use liming	Photographs	

¹⁷⁸ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392

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List of interviewees:

- Semen Drahniev, Expert of the Bioenergy Association of Ukraine, PhD in agriculture
- Sergii Kudriia, Candidate of Agricultural Sciences, Associate Professor, Professor of Kharkiv National University of Agriculture
- Oleh Riabov, Gals Agro Group of companies
- Oleksii Cherniak, agronomist at Tkachuk farm company (Odesa region)
- Dmytro Muravskyi, “Aver tech” LLC (straw pellets producer)
- Volodymyr Osadchyi, agrofarm “Bazis”, owner

D.3. Findings highly biodiverse case study

[In this section the results of the highly biodiverse case study will be added]

Appendix E. FOREST DEFINITIONS OF EU MEMBER STATES

Table 35. Minimum Values for Area Size, Tree Crown Cover and Tree Height Parameters in the forest definitions of EU Member States (as in LULUCF regulation Annex II) and as in the global standard definition of the FAO Global Forest Resources Assessment (GFRA)

Applicable area	Area (ha)	Tree crown cover (%)	Tree height (m)
FAO GFRA	0,5	10	5
Belgium	0,5	20	5
Bulgaria	0,1	10	5
Czech Republic	0,05	30	2
Denmark	0,5	10	5
Germany	0,1	10	5
Estonia	0,5	30	2
Ireland	0,1	20	5
Greece	0,3	25	2
Spain	1,0	20	3
France	0,5	10	5
Croatia	0,1	10	2
Italy	0,5	10	5
Cyprus	0,3	10	5
Latvia	0,1	20	5
Lithuania	0,1	30	5
Luxembourg	0,5	10	5
Hungary	0,5	30	5
Malta	1,0	30	5
Netherlands	0,5	20	5
Austria	0,05	30	2
Poland	0,1	10	2
Portugal	1,0	10	5
Romania	0,25	10	5
Slovenia	0,25	30	2
Slovakia	0,3	20	5
Finland	0,5	10	5
Sweden	0,5	10	5
United Kingdom	0,1	20	2

[source: Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU. Official Journal of the European Union L156/1].

[source: FAO, 2018. Terms and Definitions. Global Forest Resource Assessment 2020. Forest Resources Assessment Working Paper 188. Food and Agriculture Organization of the United Nations, Rome, 2018. URL on 20191003: <http://www.fao.org/forest-resources-assessment/en/>].

Appendix F. PARIS AGREEMENT

To this date, 187 Parties have ratified of 197 Parties to the Convention¹⁷⁹. Table 36 presents an overview of all parties and if they have ratified the Paris Agreement. Please note, that a few countries have made additional declarations.

Table 36. Parties that ratified Paris Agreement - status of ratification

No.	Participant	Signature	Ratification, Acceptance(A), Approval(AA), Accession(a)
1	Afghanistan	22-Apr-16	15-Feb-17
2	Albania	22-Apr-16	21-Sep-16
3	Algeria	22-Apr-16	20-Oct-16
4	Andorra	22-Apr-16	24-Mar-17
5	Angola	22-Apr-16	
6	Antigua and Barbuda	22-Apr-16	21-Sep-16
7	Argentina	22-Apr-16	21-Sep-16
8	Armenia	20-Sep-16	23-Mar-17
9	Australia	22-Apr-16	9 Nov 2016
10	Austria	22-Apr-16	5 Oct 2016
11	Azerbaijan	22-Apr-16	9 Jan 2017
12	Bahamas	22-Apr-16	22-Aug-16
13	Bahrain	22-Apr-16	23-Dec-16
14	Bangladesh	22-Apr-16	21-Sep-16
15	Barbados	22-Apr-16	22-Apr-16
16	Belarus	22-Apr-16	21 Sep 2016 A
17	Belgium	22-Apr-16	6 Apr 2017
18	Belize	22-Apr-16	22-Apr-16
19	Benin	22-Apr-16	31-Oct-16
20	Bhutan	22-Apr-16	19-Sep-17
21	Bolivia (Plurinational State of)	22-Apr-16	5 Oct 2016
22	Bosnia and Herzegovina	22-Apr-16	16-Mar-17
23	Botswana	22-Apr-16	11-Nov-16
24	Brazil	22-Apr-16	21-Sep-16
25	Brunei Darussalam	22-Apr-16	21-Sep-16
26	Bulgaria	22-Apr-16	29-Nov-16
27	Burkina Faso	22-Apr-16	11-Nov-16
28	Burundi	22-Apr-16	17-Jan-18
29	Cabo Verde	22-Apr-16	21-Sep-17
30	Cambodia	22-Apr-16	6 Feb 2017
31	Cameroon	22-Apr-16	29-Jul-16
32	Canada	22-Apr-16	5 Oct 2016
33	Central African Republic	22-Apr-16	11-Oct-16

¹⁷⁹ Source: Status as of: 10 December 2019; CHAPTER XXVII ENVIRONMENT: 7. d, Paris Agreement
<https://unfccc.int/process/the-paris-agreement/status-of-ratification>

No.	Participant	Signature	Ratification, Acceptance(A), Approval(AA), Accession(a)
34	Chad	22-Apr-16	12-Jan-17
35	Chile	20-Sep-16	10-Feb-17
36	China	22-Apr-16	3 Sep 2016
37	Colombia	22-Apr-16	12-Jul-18
38	Comoros	22-Apr-16	23-Nov-16
39	Congo	22-Apr-16	21-Apr-17
40	Cook Islands	24-Jun-16	1 Sep 2016
41	Costa Rica	22-Apr-16	13-Oct-16
42	Côte d'Ivoire	22-Apr-16	25-Oct-16
43	Croatia	22-Apr-16	24-May-17
44	Cuba	22-Apr-16	28-Dec-16
45	Cyprus	22-Apr-16	4 Jan 2017
46	Czech Republic	22-Apr-16	5 Oct 2017
47	Democratic People's Republic of Korea	22-Apr-16	1 Aug 2016
48	Democratic Republic of the Congo	22-Apr-16	13-Dec-17
49	Denmark	22-Apr-16	1 Nov 2016 AA
50	Djibouti	22-Apr-16	11-Nov-16
51	Dominica	22-Apr-16	21-Sep-16
52	Dominican Republic	22-Apr-16	21-Sep-17
53	Ecuador	26-Jul-16	20-Sep-17
54	Egypt	22-Apr-16	29-Jun-17
55	El Salvador	22-Apr-16	27-Mar-17
56	Equatorial Guinea	22-Apr-16	30-Oct-18
57	Eritrea	22-Apr-16	
58	Estonia	22-Apr-16	4 Nov 2016
59	Eswatini	22-Apr-16	21-Sep-16
60	Ethiopia	22-Apr-16	9 Mar 2017
61	European Union	22-Apr-16	5 Oct 2016
62	Fiji	22-Apr-16	22-Apr-16
63	Finland	22-Apr-16	14-Nov-16
64	France	22-Apr-16	5 Oct 2016
65	Gabon	22-Apr-16	2 Nov 2016
66	Gambia	26-Apr-16	7 Nov 2016
67	Georgia	22-Apr-16	8 May 2017 AA
68	Germany	22-Apr-16	5 Oct 2016
69	Ghana	22-Apr-16	21-Sep-16
70	Greece	22-Apr-16	14-Oct-16
71	Grenada	22-Apr-16	22-Apr-16
72	Guatemala	22-Apr-16	25-Jan-17
73	Guinea	22-Apr-16	21-Sep-16
74	Guinea-Bissau	22-Apr-16	22-Oct-18

No.	Participant	Signature	Ratification, Acceptance(A), Approval(AA), Accession(a)
75	Guyana	22-Apr-16	20-May-16
76	Haiti	22-Apr-16	31-Jul-17
77	Honduras	22-Apr-16	21-Sep-16
78	Hungary	22-Apr-16	5 Oct 2016
79	Iceland	22-Apr-16	21 Sep 2016 A
80	India	22-Apr-16	2 Oct 2016
81	Indonesia	22-Apr-16	31-Oct-16
82	Iran (Islamic Republic of)	22-Apr-16	
83	Iraq	8 Dec 2016	
84	Ireland	22-Apr-16	4 Nov 2016
85	Israel	22-Apr-16	22-Nov-16
86	Italy	22-Apr-16	11-Nov-16
87	Jamaica	22-Apr-16	10-Apr-17
88	Japan	22-Apr-16	8 Nov 2016 A
89	Jordan	22-Apr-16	4 Nov 2016
90	Kazakhstan	2 Aug 2016	6 Dec 2016
91	Kenya	22-Apr-16	28-Dec-16
92	Kiribati	22-Apr-16	21-Sep-16
93	Kuwait	22-Apr-16	23-Apr-18
94	Kyrgyzstan	21-Sep-16	
95	Lao People's Democratic Republic	22-Apr-16	7 Sep 2016
96	Latvia	22-Apr-16	16-Mar-17
97	Lebanon	22-Apr-16	
98	Lesotho	22-Apr-16	20-Jan-17
99	Liberia	22-Apr-16	27-Aug-18
100	Libya	22-Apr-16	
101	Liechtenstein	22-Apr-16	20-Sep-17
102	Lithuania	22-Apr-16	2 Feb 2017
103	Luxembourg	22-Apr-16	4 Nov 2016
104	Madagascar	22-Apr-16	21-Sep-16
105	Malawi	20-Sep-16	29-Jun-17
106	Malaysia	22-Apr-16	16-Nov-16
107	Maldives	22-Apr-16	22-Apr-16
108	Mali	22-Apr-16	23-Sep-16
109	Malta	22-Apr-16	5 Oct 2016
110	Marshall Islands	22-Apr-16	22-Apr-16
111	Mauritania	22-Apr-16	27-Feb-17
112	Mauritius	22-Apr-16	22-Apr-16
113	Mexico	22-Apr-16	21-Sep-16
114	Micronesia (Federated States of)	22-Apr-16	15-Sep-16
115	Monaco	22-Apr-16	24-Oct-16

No.	Participant	Signature	Ratification, Acceptance(A), Approval(AA), Accession(a)
116	Mongolia	22-Apr-16	21-Sep-16
117	Montenegro	22-Apr-16	20-Dec-17
118	Morocco	22-Apr-16	21-Sep-16
119	Mozambique	22-Apr-16	4 Jun 2018
120	Myanmar	22-Apr-16	19-Sep-17
121	Namibia	22-Apr-16	21-Sep-16
122	Nauru	22-Apr-16	22-Apr-16
123	Nepal	22-Apr-16	5 Oct 2016
124	Netherlands	22-Apr-16	28 Jul 2017 A
125	New Zealand	22-Apr-16	4 Oct 2016
126	Nicaragua		23 Oct 2017 a
127	Niger	22-Apr-16	21-Sep-16
128	Nigeria	22-Sep-16	16-May-17
129	Niue	28-Oct-16	28-Oct-16
130	North Macedonia	22-Apr-16	9 Jan 2018
131	Norway	22-Apr-16	20-Jun-16
132	Oman	22-Apr-16	22-May-19
133	Pakistan	22-Apr-16	10-Nov-16
134	Palau	22-Apr-16	22-Apr-16
135	Panama	22-Apr-16	21-Sep-16
136	Papua New Guinea	22-Apr-16	21-Sep-16
137	Paraguay	22-Apr-16	14-Oct-16
138	Peru	22-Apr-16	25-Jul-16
139	Philippines	22-Apr-16	23-Mar-17
140	Poland	22-Apr-16	7 Oct 2016
141	Portugal	22-Apr-16	5 Oct 2016
142	Qatar	22-Apr-16	23-Jun-17
143	Republic of Korea	22-Apr-16	3 Nov 2016
144	Republic of Moldova	21-Sep-16	20-Jun-17
145	Romania	22-Apr-16	1 Jun 2017
146	Russian Federation	22-Apr-16	7 Oct 2019 A
147	Rwanda	22-Apr-16	6 Oct 2016
148	Samoa	22-Apr-16	22-Apr-16
149	San Marino	22-Apr-16	26-Sep-18
150	Sao Tome and Principe	22-Apr-16	2 Nov 2016
151	Saudi Arabia	03-Nov-16	3 Nov 2016
152	Senegal	22-Apr-16	21-Sep-16
153	Serbia	22-Apr-16	25-Jul-17
154	Seychelles	25-Apr-16	29-Apr-16
155	Sierra Leone	22-Sep-16	1 Nov 2016
156	Singapore	22-Apr-16	21-Sep-16
157	Slovakia	22-Apr-16	5 Oct 2016

No.	Participant	Signature	Ratification, Acceptance(A), Approval(AA), Accession(a)
158	Slovenia	22-Apr-16	16-Dec-16
159	Solomon Islands	22-Apr-16	21-Sep-16
160	Somalia	22-Apr-16	22-Apr-16
161	South Africa	22-Apr-16	1 Nov 2016
162	South Sudan	22-Apr-16	
163	Spain	22-Apr-16	12-Jan-17
164	Sri Lanka	22-Apr-16	21-Sep-16
165	St. Kitts and Nevis	22-Apr-16	22-Apr-16
166	St. Lucia	22-Apr-16	22-Apr-16
167	St. Vincent and the Grenadines	22-Apr-16	29-Jun-16
168	State of Palestine	22-Apr-16	22-Apr-16
169	Sudan	22-Apr-16	2 Aug 2017
170	Suriname	22-Apr-16	13-Feb-19
171	Sweden	22-Apr-16	13-Oct-16
172	Switzerland	22-Apr-16	6 Oct 2017
173	Syrian Arab Republic		13 Nov 2017 a
174	Tajikistan	22-Apr-16	22-Mar-17
175	Thailand	22-Apr-16	21-Sep-16
176	Timor-Leste	22-Apr-16	16-Aug-17
177	Togo	19-Sep-16	28-Jun-17
178	Tonga	22-Apr-16	21-Sep-16
179	Trinidad and Tobago	22-Apr-16	22-Feb-18
180	Tunisia	22-Apr-16	10-Feb-17
181	Turkey	22-Apr-16	
182	Turkmenistan	23-Sep-16	20-Oct-16
183	Tuvalu	22-Apr-16	22-Apr-16
184	Uganda	22-Apr-16	21-Sep-16
185	Ukraine	22-Apr-16	19-Sep-16
186	United Arab Emirates	22-Apr-16	21 Sep 2016 A
187	United Kingdom of Great Britain and Northern Ireland	22-Apr-16	18-Nov-16
188	United Republic of Tanzania	22-Apr-16	18-May-18
189	United states of America	22-Apr-16	3 Sep 2016 A
190	Uruguay	22-Apr-16	19-Oct-16
191	Uzbekistan	19-Apr-17	9 Nov 2018
192	Vanuatu	22-Apr-16	21-Sep-16
193	Venezuela (Bolivarian Republic of)	22-Apr-16	21-Jul-17
194	Viet Nam	22-Apr-16	3 Nov 2016 AA
195	Yemen	23-Sep-16	
196	Zambia	20-Sep-16	9 Dec 2016
197	Zimbabwe	22-Apr-16	7 Aug 2017

Appendix G. OVERVIEW OF VOLUNTARY SCHEME AND OTHER INITIATIVE REQUIREMENTS ON SOIL CONSERVATION

Table 37. Overview of Voluntary Scheme (Better Biomass, Bonsucro, ISCC, RSB, RTRS) and Other Initiative (GBEP, RTFO Meta-Standard) requirements on Soil Conservation

Voluntary Scheme or Initiative	Principle	Criterion / Indicator
Better Biomass (NTA 8080-1:2015)	6.5.1 Soil	<p>6.5.1.1 Preservation and improvement of soil quality</p> <p>The organization shall take measures that are necessary in order to ensure that:</p> <ul style="list-style-type: none"> a. erosion is prevented and controlled, in which topographic risks are taken into account; b. the nutrient balance is maintained, at least as regards 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. <p>NOTE 1 An organization can apply crop rotation or intercropping to maintain and improve soil fertility and soil structure.</p> <ul style="list-style-type: none"> 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: [...] <p>NOTE 2 BioESoil 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.</p>
Bonsucro (Production Standard v4.2, 2016)	4.1 To assess impacts of sugarcane enterprises on biodiversity and ecosystems services	4.1.3 The key environmental issues are covered by an appropriate and implemented environmental impact and management plan (EIMP). Standard: >90%. (Notes: The EIMP addresses key environmental issues: biodiversity, ecosystem services, soil, water, air, climate change, use of crop protection chemicals, use of artificial fertilisers, cane burning and noise. The plan shall be implemented and progress monitored. A summary of the EIMP shall be made available to relevant stakeholders.)

Voluntary Scheme or Initiative	Principle	Criterion / Indicator
ISCC (ISCC 202 – Sustainability Requirements, v3.0, 2016)	5.2 To continuously improve the status of soil and water resources	<p>5.2.3 % Ground cover of tops or leaves after harvest. Standard: >30%. (Notes: To ensure the continuous improvement of soil organic carbon).</p> <p>5.2.4 Soil surface mechanically tilled per year (% of area under cane). Standard: <20%. (Notes: To minimise the opportunity for erosion. Percentage of soil surface tilled per year. Only tillage deeper than 20 cm shall be taken into consideration. If any portion of the field has tillage, 100% of the field area would be considered as being tilled).</p> <p>5.2.5 Percentage fields with samples showing analyses within acceptable limits for pH. Standard: <80%. (Notes: To ensure the maintenance an optimum soil pH. Sampling to be carried out at least once per crop cycle. Acceptable pH is between 5.0 and 8.0).</p>
	2.2 Use of best practices to maintain and improve soil fertility	<p>2.2.1 Improvement of soil fertility</p> <p>Crops should be grown on suitable soils. In order to ensure the sustainable treatment of soils, good agricultural practices with respect to soil quality, soil contamination and soil erosion are addressed in the soil management. They refer to:</p> <ul style="list-style-type: none"> • The prevention and control of erosion • Maintaining and improving soil nutrient balance • Maintaining and improving soil organic matter • Maintaining and improving soil pH • Maintaining and improving soil structure • Maintaining and improving soil biodiversity • The prevention of salinization <p>A soil management plan aimed at sustainable soil management, erosion prevention and erosion control must be documented. Topographical characteristics must also be considered. Annual documentation of applied good agricultural practices with respect to the above-mentioned aspects must be in place. Applying precautionary measures prevents soil degradation. Appropriate management measures include, inter alia, optimum plant spacing, crop rotation and intercropping, landscaping elements or an appropriate type and use of machinery. In order to maintain or improve soil conditions, periodical soil analysis should be conducted, on, for example, soil pH, macro- and micronutrients, heavy metals or other contaminants or soil organic matter.</p>

Voluntary Scheme or Initiative	Principle	Criterion / Indicator
		<p>2.2.2 Avoidance of soil erosion and compaction</p> <p>Measures and cultivation techniques are used to reduce risk of soil erosion. Maps of fragile soils and topographic characteristics must be available. A management strategy including measures should exist for plantings on slopes above a certain limit (specified in terms of soil, climate and topographical characteristics). A management strategy including identified measures should be in place for other fragile and problematic soils (e.g. sandy, low organic matter soils). Appropriate measures to prevent the risk of soil erosion from wind or water and to maintain the natural soil structure are, inter alia, field tillage practices (minimisation of uncovered soil e.g. between harvest and next sowing), crop rotation and the adaptation of field cultivation techniques (e.g. limitation of mechanized harvesting).</p> <p>Measures and cultivation techniques are adapted to reduce the risk of soil compaction. Applied techniques are suitable for the respective processed ground. The soil structure shall be maintained, and soil compaction shall be prevented, e.g. by an appropriate use of machinery, an appropriate timing of on-field work and an appropriate tire pressure.</p>
	<p>2.3 Use of best practices in fertiliser application</p>	<p>2.3.5 Use of wastes and agricultural residues</p> <p>Agricultural waste is reduced, reused and/or recycled. Agricultural waste and co-products can be, for example, composted on-farm and used as soil conditioning, sold to alternative markets or used for alternative purposes.</p> <p>The use of agricultural residues should not jeopardize the function of local uses of the co-products, soil organic matter or soil nutrients balance. Documentation must be available to state that the use of residues does not occur at the expense of the soil nutrient balance, soil organic matter balance or important traditional uses (such as fodder, natural fertiliser, material or local fuel), unless documentation is available to suggest that similar or better alternatives are available and are applied.</p> <p>2.3.7 Soil organic matter balance is compiled</p> <p>A soil organic matter balance is compiled (can be generic) or every six years a soil organic matter analysis takes place. Results are kept for seven years.</p>

Voluntary Scheme or Initiative	Principle	Criterion / Indicator
RSB (Principles & Criteria, v3.0, 2016)	8. Soil – Operations implement practises that seek to reverse soil degradation and/or maintain soil health	<p>8a. Operators shall implement practices to maintain or enhance soil’s physical, chemical, and biological conditions.</p> <ol style="list-style-type: none"> 1. Soil erosion shall be minimised through the design of the feedstock production site and use of sustainable practices in order to enhance soil physical health on a watershed scale. 2. Operators shall implement practices to protect soil structure, including the prevention of compaction, and maintain or enhance soil organic matter on the feedstock production site. 3. The use of agrarian and forestry residual products for feedstock production, including lignocellulosic material, shall not be at the expense of long-term soil stability and organic matter content. 4. Operators shall implement practices to maintain and improve the soil nutrient balance and reduce nitrate pollution. <ol style="list-style-type: none"> 5. Operators shall implement measures to improve soil health, such as the following Conservation Agriculture practices: <ol style="list-style-type: none"> a. Direct seeding or planting: Involves growing crops without mechanical seedbed preparation and with minimal soil disturbance; b. Maintenance of a permanent soil cover, by mulch or growing cover crops to protect the soil surface; c. Diversifying and fitting crop rotations and associations in the case of annual crops and plant associations in the case of perennial crops. 6. Where the screening exercise has triggered the need for a Soil Impact Assessment (RSB-GUI-01-008-01), operators shall: <ol style="list-style-type: none"> a. Develop a soil management plan as part of the Environmental and Social Management Plan (ESMP); b. Perform periodic sampling of soil on the feedstock production site to evaluate the effect of the soil management plan on the organic matter content. Where the practices included in the soil management plan are not seen during monitoring to maintain soil organic matter at the optimal level, alternative practices shall be investigated.

Voluntary Scheme or Initiative	Principle	Criterion / Indicator
<p>RTRS (Standard for Responsible Soy Production, v3.1, 2017)</p>	<p>5.3 Soil quality is maintained or improved and erosion is avoided by good management practices (Note: For group certification of small producers – Monitoring of soil fertility and soil quality should be part of the internal control system and can be carried out on a sampling basis within the group.)</p>	<p>5.3.1 Appropriate monitoring of soil quality including taking soil samples (soil organic matter) is in place.</p> <p>5.3.2 Knowledge of techniques to maintain soil quality (physical, chemical and biological) is demonstrated and these techniques are implemented.</p> <p>Guidance:</p> <ul style="list-style-type: none"> • Techniques to maintain soil quality may include: Conservation agriculture, Crop rotation, Balanced fertilization. • Techniques to maintain soil quality may include: Management of on-farm roads, Management of sloping areas, Maintenance of permanent soil cover, Zero tillage (no-till farming). <p>5.3.3 Knowledge of techniques to control soil erosions demonstrated f these techniques are appropriately implemented.</p> <p>5.3.4 A crop rotation plan shall be established to prevent soy from being planted immediately soy and to promote a gap on the same field. During this gap, a second or pasture should be cultivated or, at least, land shall be left fallow or under cover vegetation for regeneration purposes. This plan shall consider adapting specific climate and agro-ecological regional conditions.</p>
<p>GBEP (Sustainability Indicators for Bioenergy, 2011)</p>	<p>Indicator 2 Soil quality</p>	<p>Description: Percentage of land for which soil quality, in particular in terms of soil organic carbon, is maintained or improved out of total land on which bioenergy feedstock is cultivated or harvested.</p> <p>Relation to themes: This indicator is primarily related to the theme of Productive capacity of the land and ecosystems. Soils are an essential determinant of the productive capacity of the land. Soil degradation, which can be caused by climatic factors, poor agricultural practices and their interactions, can lower the productive capacity of the land. Appropriate agricultural and soil management practices can help to maintain or improve soil quality, and therefore have a positive effect on the productive capacity of the land. The development and use of technologies for soil conservation and management are also key.</p> <p>To maintain or improve soil quality on land used for bioenergy feedstock production, it is necessary to address the effects of soil and crop management, and in some cases forest and woody vegetation management, on five key factors that contribute to soil degradation:</p> <ol style="list-style-type: none"> 1. Loss of soil organic matter, leading to decreased carbon and soil fertility 2. Soil erosion, leading to soil loss (especially of fertile topsoil) 3. Accumulation in soils of mineral salts (salinization) from irrigation water and/or inadequate drainage, with possible adverse effects on plant growth 4. Soil compaction, reducing water flow and storage, and limiting root growth 5. Loss of plant nutrients, e.g. through intensive harvest. [...]

Voluntary Scheme or Initiative	Principle	Criterion / Indicator
RTFO (RTFO Meta-Standard)	3. Biomass production does not lead to soil degradation	<p>3.2 Application of good agricultural practices with respect to:</p> <ul style="list-style-type: none"> • Prevention and control of erosion • Maintaining and improving soil nutrient balance • Maintaining and improving soil organic matter • Maintaining and improving soil pH • Maintaining and improving soil structure • Maintaining and improving soil biodiversity • Prevention of salinization <hr/> <p>3.3 The use of agricultural by-products does not jeopardize the function of local uses of the by-products, soil organic matter or soil nutrients balance (recommendation only).</p>

Appendix H. OVERVIEW OF LITERATURE REVIEWED TO INFORM THE OPTIONS FOR COMPLIANCE WITH ARTICLE 29.2

Reference	Hyperlink	Abstract	Geographical focus
Allen B, Baldock D, Nanni S, and Bowyer C (2016) Sustainability criteria for biofuels made from land and non-land-based feedstocks. Report for the European Climate Foundation. Institute for European Environmental Policy (IEEP), London. American Society of Agronomy (2010) Energy crops impact environmental quality, review finds, ScienceDaily, 5 April 2010.	https://ieep.eu/uploads/articles/attachments/c72ca6f-7361-4e9b-b208-3c90e8308c98/ieep_2016_sustainability_criteria_for_biofuels_post_2020.pdf?v=63664509950	Creation of sustainability criteria to address environmental impacts of biofuel production.	Europe
American Society of Agronomy (2010) Energy crops impact environmental quality, review finds, ScienceDaily, 5 April 2010.	https://www.sciencedaily.com/releases/2010/04/100404203119.htm	Impacts of residue removal on soil quality.	North America
Baral A and Malins C (2014) Assessing the climate mitigation potential of biofuels derived from residues and wastes in the European context. International Council on Clean Transportation.	https://theicct.org/sites/default/files/publications/ICCT_biofuels_wastes-residues_20140130.pdf	Analysis of biofuel production from 11 main waste and residue feedstocks.	Europe
Blanco-Canqui (2012) Crop Residue Removal for Bioenergy Reduces Soil Carbon Pools: How Can We Offset Carbon Losses?	https://www.researchgate.net/publication/257772089_Crop_Residue_Removal_for_Bioenergy_Reduces_Soil_Carbon_Pools_How_Can_We_Offset_Carbon_Losses	Analysis of crop residue removal for bioenergy and the implications on soil organic carbon (SOC) pools.	Global
Cherubin et al. (2018) Crop residue harvest for bioenergy production and its implications on soil functioning and plant growth: A review.	http://www.scielo.br/scielo.php?script=sci_artext&pid=S0103-90162018000300255	Crop residue management for bioenergy production.	Global
Creutzig et al. (2015) bioenergy and climate mitigation: an assessment.	http://onlinelibrary.wiley.com/doi/10.1111/gcb.b.12205/full	Analysis of bioenergy deployment in 2050 and assessment of environmental impacts, including on soil, from harvesting.	Global
Ecofys (2013) Low ILUC potential of wastes and residues for biofuels: straw, forestry residues, UCO, corn cobs.	http://www.mvak.eu/test5674213467/Ecofys_2013_low_ILUC.pdf	Assessment of the sustainable low ILUC risk potential for cereal straw and corn cobs-based biofuel production.	Europe
Ecofys and IEEP (2016) Options to further improve the efficiency of sustainability certification for biofuels and bioliquids.	Not published	Study to elaborate detailed approaches that have the potential to further improve the reliability of certification, but at the same time avoid unnecessary administrative burdens on operators.	Global
ENRD (2018) EU Rural Review No. 25. Resource Efficiency. Soil and carbon conservation.	https://enrd.ec.europa.eu/sites/enrd/files/enrd_publications/publi-enrd-rr-25-2018-en.pdf	Discussion paper on soil carbon capture potential and needs.	Europe

Reference	Hyperlink	Abstract	Geographical focus
ETIP Bioenergy (2019) Agricultural residues as feedstocks for biofuel production.	http://www.etipbioenergy.eu/value-chains/feedstocks/agriculture/agricultural-residues	Repository of presentations, studies and briefings on using agricultural residues for biofuel in Europe.	Europe
FAO (2017) Voluntary guidelines for sustainable soil management.	http://www.fao.org/3/a-bl813e.pdf	Internationally recognised guidelines to develop a soil management plan.	Global
Gang Zhao et al. (2015) Sustainable limits to crop residue harvest for bioenergy: maintaining soil carbon in Australia's agricultural lands.	https://onlinelibrary.wiley.com/doi/pdf/10.1111/gcbb.12145	Sustainable removal of residue for bioenergy.	Australia
Ghimire et al. (2017) Cover Crop Residue Amount and Quality Effects on Soil Organic Carbon Mineralization.	https://www.google.it/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=2ahUKEwjyruYgPHkAhVmTBUIHaqnC3oQFjACegQIARAC&url=https%3A%2F%2Fwww.mdpi.com%2F2071-1050%2F9%2F12%2F2316%2Fpdf&usq=AOvVaw3mXx1QVfEKv-b6a12EoE1M	Analysis of SOC mineralization kinetics with different cover crop residue amendments.	Global
Gobin et al. (2011) Soil organic matter management across the EU – best practices, constraints and trade-offs.	https://ec.europa.eu/environment/soil/som_en.htm	Assess the relative contributions of the different inputs and outputs of organic carbon and organic matter to and from the soil.	Europe
HGCA (2014) Straw incorporation review.	https://cereals.ahdb.org.uk/media/470361/rr81-web.pdf	Examination of the environmental, economic and practical impacts of wheat and oilseed rape straw incorporation versus removal.	Europe
ICCT and NNFC (2014) Wasted. Europe's untapped resource. An assessment of advanced biofuels from wastes and residues.	https://europeanclimate.org/wp-content/uploads/2014/02/WASTED-final.pdf	Review of the sustainability issues, including soil impacts, linked to the use of wastes and residues for biofuel production.	Europe
IEEP (2012) Mobilising cereal straw in the EU to feed advanced biofuel production.	https://ieep.eu/uploads/articles/attachments/7027de1e-dc4d-43e8-8126-16402efe66ed/IEEP_Agricultural_residues_for_advanced_biofuels_May_2012.pdf?v=63664509775	Environmental and soil considerations in using straw as a bioenergy feedstock.	Europe
IEEP (2013) Technology options for feeding 10 billion people. Recycling agricultural, forestry & food wastes.	http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/513513/IPOL-JOIN_ET%282013%29513513%28SUM01%29_EN.pdf	Assessment of the sustainability of mobilising agricultural crop waste and residue streams, including impacts on soil.	Europe
IEEP and BIO (2008) Land degradation and desertification.	http://www.europarl.europa.eu/RegData/etudes/etudes/join/2009/416203/IPOL-ENVI_ET(2009)416203_EN.pdf	Integrated picture of soil degradation issues and actions within the EU.	Europe

Reference	Hyperlink	Abstract	Geographical focus
IFAD (2019) Climate change mitigation potential of agricultural practices supported by IFAD investments.	https://www.ifad.org/documents/38714170/41066943/35_research.pdf/73e25d17-2d7b-b268-1edc-69c87d8d5668	Effects of a large set of agricultural practices promoted by IFAD on soil organic carbon stocks, nitrous oxide emissions from soils, and methane emissions from rice paddies.	Global
Joint Research Centre (2018) Biomass production, supply, uses and flows in the European Union.	http://publications.jrc.ec.europa.eu/repository/bitstream/JRC109869/jrc109869_biomass_report_final2pdf2.pdf	Assessment of EU biomass production, uses, flows and related environmental impacts for the sectors agriculture, forestry, fisheries and aquaculture, and algae.	Europe
Lafond et al. (2009) Quantifying Straw Removal through Baling and Measuring the Long-Term Impact on Soil Quality and Wheat Production, Agronomy Journal 101(3).	https://www.researchgate.net/publication/250103295_Quantifying_Straw_Removal_through_Baling_and_Measuring_the_Long-Term_Impact_on_Soil_Quality_and_Wheat_Production	Evaluate impacts of 50 year of straw removal with baling on soil quality and wheat production.	North America
Laird and Chang (2013) Long-term impacts of residue harvesting on soil quality. Soil and Tillage Research, 134, 33-40.	https://ir.nctu.edu.tw/bitstream/11536/22941/1/000326553700005.pdf	Impacts of harvesting residues on soil quality.	Global
Lal (2009) Soil quality impacts of residue removal for bioethanol production.	https://www.researchgate.net/publication/240391586_Soil_quality_impacts_of_residue_removal_for_bioethanol_production	Impact of residue removal on soil quality.	Global
Lesschen et al. (2015) How much straw can be removed in the EU without negative effects on soil carbon?		Assessment of straw removal potential in Europe.	Europe
Mann et al (2002) Potential environmental effects of corn stover removal with emphasis on soil organic matter and erosion. Agriculture Ecosystems & Environment, 89, 149-166.	https://www.researchgate.net/publication/223094399_Potential_environmental_effects_of_corn_Zea_mays_L_stover_removal_with_emphasis_on_soil_organic_matter_and_erosion	Impacts of corn stover removal on soil organic matter and erosion.	Global
Mohammed et al. (2018) Significance of agricultural residues in sustainable biofuel development.	https://www.intechopen.com/books/agricultural-waste-and-residues/significance-of-agricultural-residues-in-sustainable-biofuel-development	Assessment of availability of residue feedstocks for bioenergy and related environmental impacts, including on soil carbon.	Global
Monteleone et al. (2015) Cereal Straw Management: A Trade-Off Between Energy and Agronomic Fate, DOI: 10.4081/ija.2015.655.	https://agronomy.it/index.php/agro/article/view/ija.2015.655/584	Estimate of long-term SOM using modelling simulation.	Europe
Monteleone et al. (2015) Straw-to-soil or straw-to-energy? An optimal trade off in a long term sustainability perspective.	http://www.sciencedirect.com/science/article/pii/S0306261915005711	Examination of management strategies of wheat cultivation system and its sustainability in using straw as an energy feedstock.	Europe

Reference	Hyperlink	Abstract	Geographical focus
Neill (2011) Impacts of crop residue management on soil organic matter stocks: a modelling study.	https://www.researchgate.net/publication/251561708_Impacts_of_crop_residue_management_on_soil_organic_matter_stocks_A_modelling_study	Modelling study on the impacts of crop residue management on soil organic matter.	Europe
NL Agency of Ministry of Economic Affairs (2013) Rice straw and Wheat straw; Potential feedstocks for the Biobased Economy.	http://edepot.wur.nl/288866	Use of rice and cereal straw for bioenergy - includes section on sustainable straw removal.	Europe
Oeko, IIASA, IEEP, Indufor and EFI (2016) Study on impacts on resource efficiency of future EU demand for bioenergy - ReceBio. Task 2: Analysis of impacts of biomass production on natural resources and the global environment.	https://ec.europa.eu/environment/enveco/resource_efficiency/pdf/studies/Task%202.pdf	Review of environmental and economic impacts of extracting biomass for energy, including soil-related.	Europe
Powelson et al (2011) Soil carbon sequestration to mitigate climate change: a critical re-examination to identify the true and false.	http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2389.2010.01342.x/abstract	Examination of soil carbon sequestration benefits, including ILUC impacts and use of land for bioenergy.	Europe
Powelson et al. (2008) Carbon sequestration in European soils through straw incorporation: limitations and alternatives.	https://www.sciencedirect.com/science/article/pii/S0956053X07003224	Review of the alternative uses of cereal straw (incorporation into soil or electricity production) and their effectiveness in relation to climate change mitigation.	Europe
Powelson et al. (2011), Implications for Soil Properties of Removing Cereal Straw: Results from Long-Term Studies, Agronomy Journal, Volume 103, Issue 1, pages 279-287.	https://www.researchgate.net/publication/273069854_Implications_for_Soil_Properties_of_Removing_Cereal_Straw_Results_from_Long-Term_Studies	Review of 25 long-term studies on impact of straw removal on SC.	Europe
Ransom et al. (2011) Introduction: evaluating long-term impacts of harvesting crop residues on soil quality.	https://www.researchgate.net/publication/274246670_Introduction_Evaluating_Long-Term_Impacts_of_Harvesting_Crop_Residues_on_Soil_Quality	Evaluation of impacts of crop residue removal on soil carbon.	Europe, Canada, Australia, and the US
Rural Development Service (2005) Producing a Soil Management Plan for Environmental Stewardship.	http://adlib.eversite.co.uk/resources/000/107/821/soil-management-plan.pdf	Guidelines to develop a soil management plan in England.	UK
Scarlat et al. (2010) Assessment of the availability of agricultural crop residues in the European Union: Potential and limitations for bioenergy use.	https://www.sciencedirect.com/science/article/pii/S0956053X10002436	Assessment of the availability of agricultural crop residues in the EU.	Europe
Scarlat et al. (2019) Integrated and spatially explicit assessment of sustainable crop residue potential in Europe.	https://www.researchgate.net/publication/330933202_Integrated_and_spatially_explicit_assessment_of_sustainable_crop_residues_potential_in_Europe	Assessment of sustainable crop residue potential in Europe.	Europe
Searle & Bitnere (2017) Review of the impact of crop residue management on soil organic carbon in Europe.	https://theicct.org/sites/default/files/publications/EU-crop-residue-mgmt_ICCT-working-paper_15122017_vF.pdf	Reviews of the evidence on the environmental impacts of crop residue harvest in the EU.	Europe

Reference	Hyperlink	Abstract	Geographical focus
Searle & Malins (2016) Waste and residue availability for advanced biofuel production in EU Member States.	http://www.sciencedirect.com/science/article/pii/S0961953416300083	Elaboration on the environmental risks (including on soil quality) to model the amount of residues needed.	Europe
Tarkalson et al. (2009) Impact of Removing Straw from Wheat and Barley Fields: A Literature Review, Better Crops/Vol. 93 (2009, No. 3).	http://www.ipni.net/publication/bettercrops.nsf/0/579DC82AB18278F785257980006F84AF/\$FILE/Better%20Crops%202009-3%20p17.pdf	Literature review of the effects of straw removal on SOC and nutrient depletion.	North America
Wilhelm WW, Hess JR, Karlen DL et al. (2010) Review: balancing limiting factors & economic drivers for sustainable Midwestern US agricultural residue feedstock supplies. Industrial Biotechnology, 6, 271–287.	https://naldc.nal.usda.gov/download/47215/PDF	Examination of agronomic factors defining the limits and opportunities for harvesting crop residue for biofuel feedstock in the Midwestern US.	United States

Appendix I. EU SUSTAINABLE FINANCE TAXONOMY

In order to inform its work on the [action plan: financing sustainable](#) growth published in March 2018, the European Commission established a [Technical Expert Group \(TEG\)](#) on sustainable finance in July 2018. Action 1 of the action plan calls for the establishment of an EU classification system for sustainable activities, i.e. an EU taxonomy. The European Commission followed through on this action in May 2018 with a [proposal for a regulation on the establishment of a framework to facilitate sustainable investment](#) (Taxonomy regulation). On 5 December 2019, the Council and the European Parliament reached a political agreement on the Taxonomy Regulation. Within the framework of the Taxonomy Regulation, the TEG was asked to develop recommendations for technical screening criteria for economic activities that can make a substantial contribution to climate change mitigation or adaptation, while avoiding significant harm to the other environmental objectives set out in the taxonomy.

The management practices proposed in the EU Sustainable Finance Taxonomy for Agriculture are based on a consultative exercise with the Agriculture Technical Expert Group (AgriTEG) (including DG AGRI, CLIMA, ENER, EIB, Industry representatives, NGOs and others), invited external experts, and two consultants (IEEP and Ecologic) – these are set out in full for the whole Taxonomy in chapter 6 – pages 64 – 66 of the main Taxonomy document (https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf). The management practices are designed to provide an alternative means of demonstrating substantial contribution to climate mitigation as explained on pages 103 and 104 of the Technical Annex to the Taxonomy (https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy-annexes_en.pdf) and set out below in an edited extract.

The Taxonomy recognises that specific GHG improvement targets are a fairly blunt instrument and require farm level GHG accounting, which is not yet widespread. Therefore, an additional, alternative approach was proposed and included in the Taxonomy. Namely, **demonstration of the deployment of a specified bundle of land and, if appropriate, animal management practices across the production area**. From a review of the scientific literature, these practices have been selected because they deliver substantial mitigation with relatively high certainty across a range of biophysical and farming conditions. They should therefore be widely applicable [globally] and provide a more directly communicable approach to farmers, although this would benefit from testing with key stakeholders globally, including small- and large-scale farmers. It will, of course, be necessary to regularly review this list of practices to integrate new advances in scientific knowledge.

Whichever approach is taken in the Taxonomy, three yearly audits are required to demonstrate ongoing compliance with the criteria and thresholds. This is to address the multi-year timeframes over which emissions reductions and carbon stocking can occur and acknowledges the risks to the permanence of carbon stocks. The establishment of a pool of proxy indicators for compliance with these Criteria (such as vetted and approved existing standards, certification schemes, carbon credit schemes and similar) would greatly facilitate uptake of and disclosure against the Criteria.

More information can be found on the European Commission's website: https://ec.europa.eu/info/publications/sustainable-finance-teg-taxonomy_en

The essential management practices listed for non-perennial crops are set out in the table below:

Management category	Management practice	GHG ↓	C-Seq ↑	Co-benefits
Farm GHG assessment	Undertake a GHG assessment of sources of emissions and sinks on the farm. Existing and verified tools should be used. No auditing of the GHG assessment is required.	√	√	√
Crop choice and rotation (to increase carbon sequestration in soil, reduce fertilizer need, and N2O emissions)	At least a 5-crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1.	√	√	√
	Sowing of cover/catch crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	√	√	√
	Residue management	√		
Soil management (in order to prevent soil erosion and carbon losses from soils, and maintain soil health and agricultural productivity)	Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; stock density should be reduced to avoid compaction, especially on wet soils; controlled traffic planning can be used). For best long-term results, drainage assessment and improvements needed to be carried out regularly).	√		√
	Management of carbon-rich soils <ul style="list-style-type: none"> • Avoiding deep ploughing on carbon-rich soils • Avoiding row crops and tubers • Maintaining a shallower water table – peat • Maintaining a shallower water table – arable 	√		√
	Avoid water-logging and compaction on drained soils	√		
	Maintain permanent grassland ¹⁸⁰	√	√	√
Nutrient management (in order to reduce N2O emissions)	No burning of arable stubble except where authority has granted an exemption for plant health reasons ¹⁸¹ .	√		
	Nutrient management plan to optimize fertilization and improve nitrogen use efficiency. The plan should be based on soil testing, estimating of crops nutrient requirements, recording of nutrient applications, considering field characteristics and soil type, estimating soil nitrogen supply, and where applicable analysis of manure nutrient content prior to application. In addition, it is required that a low emission N- application technology is used (e.g. slurry injection, incorporating manure in the soil within two hours of spreading) and fertilizer spreaders which have low coefficient of variation (synthetic fertilizer and farmyard manure (e.g. placing N in the soil via injection), combined with calibration of spreaders.	√	√	√

Paddy Rice management	Shallow flooding	√		
	Mid-season drying event	√		
	Off-season straw	√		
Structural elements with mitigation potential (in order to increase C sequestration)	Conversion of low productivity land (e.g. along field edges) into woodland to increase C sequestration and protect against soil erosion.		√	√
Waste management	Minimize post-harvest loss	√		
Energy use	Where energy emissions represent more than 20% of total emissions from non-perennial crop production activity, these emissions should be appropriately for the term of the investment, in line with the trajectory outlined on P11 (of the Technical annexes to the Taxonomy) i.e. by at least 10% compared to a 2020 baseline for a five year investment period, 20% compared to a 2020 baseline for a 10 year investment period to 2030, and 30% compared to a 2020 baseline for a 20 year investment period – with pro-rata adjustments for investments of intermediate durations.	√		

¹⁸⁰ Consistent with GAEC 1 of Annex III of COM(2018)392.

¹⁸¹ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392.

Appendix J. KEY REFERENCE STUDIES AND ASSOCIATED RESIDUE REMOVAL RATES AT EU AND GLOBAL LEVEL

Reference	Geographical scope	Feedstock scope	Sustainable removal rate	Comments
Lafond et al. (2009)	North America	Wheat	<40%	The study concluded that potential exists to use crop residues for ethanol production or other industrial purposes without adversely affecting the long-term productivity of medium- to heavy-textured soils providing that <40% of the total above ground residues other than grain are removed and the frequency of removal is no more than 2 year out of 3.
Scarlat et al. [Joint Research Centre] (2010)	EU	Cereal crops, maize, rapeseed, sunflower, rice	40% for wheat, rye, barley, oats 50% for maize, rice, rapeseed, sunflower	<p>The estimated sustainable removal rates were based on expert estimations derived from data reported in the literature review. Of the 13 data sources identified (covering 1995 to 2007), the majority of these data sources were relevant for cereal crops and maize. In contrast, only 2 data sources were relevant for sunflower, rapeseed and rice.</p> <p>The sustainable removal rates cited in the literature are presented in the paper and seen to vary across a wide range.</p> <ul style="list-style-type: none"> • 15-60% for wheat, rye, barley, oats • 25-82% for maize (the higher value is for no-till) • 30-60% for sunflower • 30-50% for rapeseed • 60% for rice
Powelson et al. (2011)	Global	Wheat	N/A	An assessment of the results from 25 long-term studies concluded that, although changes in SOC resulting from addition or removal of straw are small, it would be unwise to remove straw every year as this is likely to lead to deterioration in soil physical properties. Local assessments are required to determine the frequency of straw removal that is acceptable for soil functioning; this will influence the capacity of bioenergy installations.

Reference	Geographical scope	Feedstock scope	Sustainable removal rate	Comments
Ecofys (2013)	EU-10	Cereal crops	40% default, tailored to Member States' specific soil conditions (between 33% and 50%)	<p>The estimated sustainable removal rates proposed by Scarlet et al. (2010) were applied as a default. These were validated based on a literature review and expert interviewed. On this basis, the estimates were tailored per Member State.</p> <p>The experts consulted in Denmark and Romania considered that 40% was representative. A removal rate of 33% was recommended for Hungary.</p> <p>Removal rates for France and Germany were 50% and 34% respectively, based on literature.</p> <p>40% was applied in all other Member States (Italy, Netherlands, Poland, Spain, UK).</p>
Professor Powlson, Rothamstead Research (2013)	EU	Cereal crops	25-50% 33% as default	<p>Professor Powlson, a soil science expert associated with the Rothamsted Research centre in England, provided expert input to the Ecofys (2013) study.</p> <p>His view is that the sustainable removal rate is site specific and likely to vary across a wide range, depending on a number of factors, including the resilience of the soil. It is recommended that local studies are undertaken to establish the necessary straw input to maintain appropriate soil properties before embarking on a straw-based bioenergy program.</p>
Baral A and Malins C (2014)	EU	Not specified	33%	<p>33% of residues are assumed to be left in the field to maintain soil fertility, whilst 33% are set aside for existing uses (i.e. animal husbandry).</p> <p>The study does not provide any supporting evidence for a 33% removal rate.</p>
Zhao et al. (2015)	Australia	Wheat	50-75%	<p>Environmental conditions and management practices should be considered to guide the harvest of crop residue for bioenergy production (including sustainable removal of residues).</p> <p>Modelling indicated that with up to 75 kg N/ha fertilisation, 50-75% of crop residue could be sustainably harvested. Higher fertilisation rates achieved little further increase in sustainable residue harvest rates.</p>

Reference	Geographical scope	Feedstock scope	Sustainable removal rate	Comments
Lesschen et al. (2015)	EU	Cereal crops, maize, rapeseed, sunflower, rice	0-100%	<p>It is indicated that many studies suggest that a default fraction (e.g. 40%) should remain, but without clear scientific foundation.</p> <p>The removal rate is variable, depending on crop yield, soil and climate conditions.</p> <p>Stubbles, chaff and below ground carbon input can be sufficient to maintain current SOC levels. However, uncertainty is large, particularly for below ground carbon.</p>
Bonsucro Production Standard, v4.2 (2016)	Global	Sugar cane	Max. 70%	<p>The standard includes a requirement (5.2.3) to leave over 30% of the ground cover of tops or leaves after harvest to ensure the continuous improvement of soil organic carbon.</p>
RSB Certification Protocol and Guidance for Harvesting Corn Stover as a feedstock for Biofuels or Bio-products	North America	Corn stover	Max. 30%	<p>Remove only the amount of stover which will not adversely affect the level of erosion protection and maintenance of soil organic matter levels (typically no more than 30% of the stover, or 2.5-5.0 mt/ha.</p> <p>As a general rule, if a field is not producing at least 7.4 mt/ha of corn yield, then no stover shall be removed.</p>
Scarlat et al. [Joint Research Centre] (2019)	Europe	Cereal crops, maize, rapeseed, sunflower, rice	25-75%	<p>The fraction of sustainable crop residue extraction is difficult to quantify because it depends on cultivated crops, soil conditions (soil type, soil organic carbon, etc.), farming practices (crop rotation, fertiliser application) and climate (temperature, precipitations), which are all very location specific.</p>