

S2Biom Project Grant Agreement n°608622

Deliverable 5.1:

**Benchmark and gap analysis of criteria and indicators (C&I)
for legislation, regulations and voluntary schemes at
international level and in selected EU Member States**

Main Report

March 2015



About S2Biom project

The S2Biom project - Delivery of sustainable supply of non-food biomass to support a “resource-efficient” Bioeconomy in Europe - supports the sustainable delivery of non-food biomass feedstock at local, regional and pan European level through developing strategies, and roadmaps that will be informed by a “computerized and easy to use” toolset (and respective databases) with updated harmonized datasets at local, regional, national and pan European level for EU28, Western Balkans, Moldova, Turkey and Ukraine. Further information about the project and the partners involved are available under www.s2biom.eu.

Project coordinator



Scientific coordinator



Project partners



About this document

This report corresponds to deliverable 5.1 – Benchmark and gap analysis of criteria and indicators (C&I) for legislation, regulations and voluntary schemes at international level and in selected EU Member States.

Due date of deliverable:	December 2014
Actual submission date:	March 2015
Start date of project:	2013-01-09
Duration:	36 months

Work package	5
Task	5.1
Lead contractor for this deliverable	IINAS
Editor	n.a.
Authors	Leire Iriarte, Uwe R. Fritsche (IINAS) with contributions from: Matthias Dees (ALU-FR), Marc Londo (ECN), Joanne Fitzgerald (EFI), Calliope Panoutsou (IC), Boyan Kavalov, and Jorge Cristobal Garcia (JRC), Luc Pelkmans (VITO)
Quality reviewer	

Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Version	Date	Author(s)	Reason for modification	Status
0.1	13/02/2015	Leire Iriarte, Uwe R. Fritsche	First version defining request for input from partners	Draft
0.2	30/03/2015	Leire Iriarte, Uwe R. Fritsche	Inputs from partners received and included	Final
1.0	7/04/2017	Uwe R. Fritsche	Minor corrections	Revised Final

This project entitled S2BIOM (Delivery of sustainable supply of non-food biomass to support a “resource-efficient” Bioeconomy in Europe) is co-funded by the European Union within the 7th Framework Programme. Grant Agreement n°608622.

The sole responsibility of this publication lies with the author. The European Union is not responsible for any use that may be made of the information contained therein.

Executive Summary

This report aims to contribute to a better understanding about sustainability requirements by analysing a selected representative list of schemes and regulations relevant for the bioeconomy. This will help elaborate a sound approach to biomass sustainability in the S2Biom project. The specific objectives of this task are:

- Benchmark the selected schemes based on criteria and indicators (C&I) against the draft S2Biom sustainability indicators with the aim of characterizing sectoral patterns and of identifying gaps.
- Identify concepts present in other schemes that could help enhance the final S2Biom approach to sustainability.

To achieve these specific objectives, several activities have been carried out:

1. **Identification of representative schemes:** Sustainability schemes in the forestry, agriculture, bioenergy, and waste management sectors, among others, were considered in order to present a global review of sustainability considerations. The analysis took into account international and national schemes and/or regulations as well as voluntary approaches. These schemes concern various regions, different feedstocks and assorted end uses.
2. **Benchmark and Gap Analysis:** Selected schemes were structured as a set of C&I and they were benchmarked against the draft S2Biom structure. The results of the selected schemes were aggregated sectorally to understand the respective patterns more deeply.
3. **Identification of additional issues:** All schemes were examined further to identify elements that are not currently represented in the draft S2Biom approach to sustainability, and could enhance its performance. These additional concepts have been classified as framework indicators and complementary indicators. For each of these categories we have distinguished between “topics” and “indicators”.

In total, more than 50 schemes and regulations were selected, covering broad bioeconomy aspects. From this total, 31 schemes and regulations were benchmarked against the S2Biom draft proposal (objective 2 above) of which 6 corresponded to the agriculture sector, 14 to the forest sector and 11 to the bioenergy sector. Given the variability in the structure and function of the remaining schemes, these schemes were used only to identify potential additional useful concepts for the S2Biom approach (objective 3 above), without systematizing their requirements. The benchmark and gap analysis (Section 4) showed that schemes from different sectors managed environmental impacts to

varying degrees with the exception of resource efficiency, which was not meaningfully considered in any of the schemes. Biodiversity, soil and land tenure are well reflected, while indicators related to climate change, water, participation and transparency as well as employment conditions and labour rights were partially covered in the schemes. Social and economic impacts were found to be typically less well reflected. The same general patterns are found when solely investigating the selected voluntary certification schemes.

The analysis of other concepts of interest for the S2Biom proposal in the benchmarked schemes resulted in detecting 4 framework topics and 18 respective indicators. The analysis of complementary concepts resulted in 20 topics and 39 indicators.

Non-benchmarked schemes provided complementary concepts such as cascading use, requirements to deal with biomass competition, and considerations regarding type of feedstocks that should be used for different purposes (e.g. for solid bioenergy).

All of the above considerations might contribute to enhancing the S2Biom approach to sustainability. In particular, these findings might serve to propose well-grounded policy recommendations to support further development of sustainable bioeconomy strategies develop an appropriate set of sustainability indicators particularly for specific feedstocks and/or value-chains and further refine the S2Biom sustainability criteria and indicators proposal.

Table of contents

About S2Biom project.....	1
About this document	2
Executive Summary	3
List of Figures.....	6
List of Tables	6
1 Introduction and Objectives.....	9
2 Methodology.....	12
2.1 Identification of Schemes	13
2.2 S2Biom Draft Sustainability C&I Proposal	14
2.3 Benchmarking against the S2Biom Proposal	15
2.4 Identification and Benchmark of Other Concepts	17
2.5 Additional Requirements in Non-Benchmarked Schemes	18
3 Identification of Schemes.....	19
4 Benchmark and Gap Analysis.....	31
4.1 S2Biom C&I Proposal.....	31
4.2 Benchmark and Gap Analysis	35
5 Other Relevant Concepts	47
5.1 Framework Indicators	47
5.2 Complementary Indicators.....	48
5.3 Other requirements.....	52
6 Conclusions and Recommendations	58
References.....	60

List of Figures

Figure 1 Overall Configuration of Sustainability Activities in S2Biom	10
Figure 2 Steps of the Benchmark and Gap Analysis	12

List of Tables

Table 1 Identified Schemes and Regulations in Biomass Supply and Use Sectors	26
Table 2 Overview of benchmarked and non-benchmarked schemes by sectors	29
Table 3 Draft Sustainability Criteria and Indicators for the Bioeconomy as Proposed in the framework of the S2Biom project	32
Table 4 Compilation of the Benchmark and Gap analysis of the selected Schemes and Regulations against the (draft) S2Biom Indicators	39
Table 5 Benchmark and Gap analysis of the selected Forest Schemes against the (draft) S2Biom Indicators.....	41
Table 6 Benchmark and Gap analysis of the selected Agricultural Schemes against the (draft) S2Biom Indicators	43
Table 7 Benchmark and Gap Analysis of the selected Bioenergy Schemes against the (draft) S2Biom Indicators	45
Table 8 Framework indicators identified in the selected schemes	47
Table 9 Other concepts identified in the benchmarked schemes.....	49

List of Acronyms and Abbreviations

BMELV	German Federal Ministry of Food, Agriculture and Consumer Protection (until 2013)
BMEL	German Federal Ministry of Food and Agriculture (from 2014 onwards)
BOD	Biological Oxygen Demand
Bonsucro EU	Bonsucro scheme aimed to show compliance with the EU Renewable Energy Directive's requirements
BP	Best Practices
C&I	Criteria and Indicators
CAP	Common Agricultural Policy
CEN	European Committee for Standardization
CENBIO	Centro Nacional de Referência em Biomassa (Brazil)
CL	Country Level
EC	European Commission
EFI	European Forest Institute
EMBRAPA	Brazilian Agricultural Research Corporation
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FSC	Forest Stewardship Council
FUL	Forest Unit Level
FW	Framework Indicators
GBEP	Global Bioenergy Partnership
GEF	Global Environment Facility
GGL	Green Gold Label
GHG	greenhouse gas(es)
GMO	genetically modified organisms
GRI	Global Reporting Initiative
IAS	Invasive Alien Species
IINAS	International Institute for Sustainability Analysis and Strategy
II	Implementable Indicators
ILUC	indirect land use change(s)
ISCC	International Sustainability Carbon Certification

ISCC-EU	International Sustainability Carbon Certification scheme to show compliance with the EU Renewable Energy Directive's requirements
ISCC PLUS	International Sustainability Carbon Certification for food and feed products as well as for technical/chemical applications and applications in the bioenergy sector
ITTO	International Tropical Timber Organization
LUC	land use change(s)
MS	Member States
NEN	Netherlands Standardization Institute
PEFC	Program for the Endorsement of Forest Certification
RE	Resource Efficiency
RED	Renewable Energies Directive 2009/28/EC
RSB	Roundtable on Sustainable Biomaterials
RSPO	Roundtable on Sustainable Palm Oil Production
RTRS	Roundtable on Responsible Soy
RSPO RED	Roundtable on Sustainable Palm Oil Production. Scheme aimed to show compliance with the EU Renewable Energy Directive's requirements
RTRS EU RED	Roundtable on Responsible Soy. Scheme aimed to show compliance with the EU Renewable Energy Directive's requirements
SAN	Sustainable Agriculture Network
SBP	Sustainable Biomass Partnership
SFI	Sustainable Forestry Initiative
SFM	Sustainable Forest Management
VGGT	Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security

1 Introduction and Objectives

The general objective of S2Biom Work Package 5 (WP5) is to provide an improved understanding among decision-makers in policy and industry regarding **sustainability requirements** in biomass value chains addressed in Theme 1.

This goes beyond previous discussions on sustainability of liquid biofuels¹ and the ongoing discussions on solid/gaseous bioenergy² and biomaterials³ in aiming to develop comprehensive sustainability requirements for **all non-food biomass** in the broader **bioeconomy**⁴.

To achieve this, specific objectives of WP5 are:

1. Adaptation of the life-cycle-based EC Environmental Footprint methods in order to develop a complementary methodology specific to non-food biomass value chains⁵,
2. Identification of sustainability criteria and indicators (C&I) for non-food biomass value chains, gap analysis of respective legislation, regulation and voluntary schemes at international, European and Member State level (i.e. this paper),
3. Compilation of consistent sustainability C&I for the short- and medium-term bioeconomy, and an outlook for long-term developments, and
4. Development of guidelines for applying the toolset developed in WP4 to evaluate the environmental performance of biomass for bioenergy and bio-based product (e.g. chemical, material, etc.) supply chains⁶.

To this end, five tasks have been identified in WP5, as shown in Figure 1.

¹ See EU (2009a) for the respective requirements in the EU, and Franke et al. (2013) for global requirements.

² See EC (2014a) for the view of the European Commission on that, and Fritsche et al. (2014) for other views.

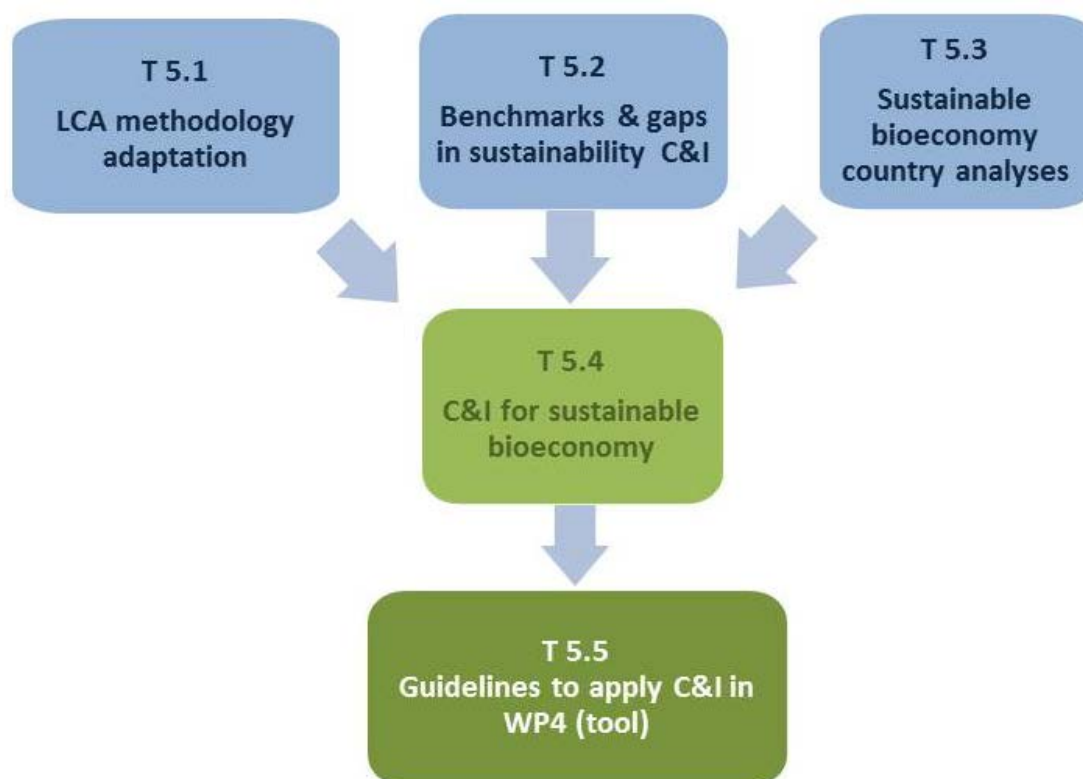
³ See e.g. activities within the BISO (<http://sa.jrc.ec.europa.eu/>), the FP7 project Bioeconomy observatory (<http://www.biobasedeconomy.eu/>) and INRO (<http://www.inro-biomasse.de/en.htm>)

⁴ Bioeconomy encompasses the production of renewable biological resources and the conversion of these resources and waste streams into value added products, such as food, feed, bio-based products and bioenergy (EC 2012a, EC 2012b). For a discussion of activities on bioeconomy sustainability requirements, see Fritsche, Iriarte (2014).

⁵ See WP5 Task 5.2 (carried out by the JRC) with its deliverable D5.2

⁶ See WP5 Task 5.5 (carried out by EFI).

Figure 1 Overall Configuration of Sustainability Activities in S2Biom



Source: own elaboration

This paper presents findings from Task 5.1, focusing on the benchmark and gap analysis of criteria and indicators (C&I) for legislation, regulations and voluntary schemes at the international level and for selected EU Member States.

The specific objectives of Task 5.1 are:

- Identify the **patterns** of C&I among the various biomass supply and use sectors by means of:
 - **Benchmark** identified sustainability requirements from the selected schemes against the draft S2Biom proposal.
 - Analyse **concept gaps** in existing schemes in comparison with the draft S2Biom proposal,
- Identify **other sustainability concepts** that might be helpful to strengthen the S2Biom sustainability proposal.

Ultimately, the findings from Task 5.1 will **help improve** the draft S2Biom C&I proposal in Task 5.4, according to relevant findings, and also Task 5.5 will benefit from the information collected here.

This paper is structured as follows:

- Section 2 presents the methodology used for the benchmarking and gap analysis.
- Section 3 introduces and briefly discusses the identified schemes.
- Section 4 shows the benchmarking and gap analysis for the various schemes in the forestry, agriculture and bioenergy sectors.
- Section 5 describes additional concepts identified in the non-benchmarked schemes that may be useful in evaluating a feedstock, value chain or end use.
- Section 6 offers conclusions on the important next steps for Tasks 5.4 and 5.5.

The (external) **Annex** provides the full description of the requirements in the schemes benchmarked against the S2Biom draft C&I. Furthermore, the Annex contains details of the additional concepts identified in Task 5.1 (see Section 5).

2 Methodology

To meet the objectives described above, four main steps were carried out, as shown in Figure 2, and described below.

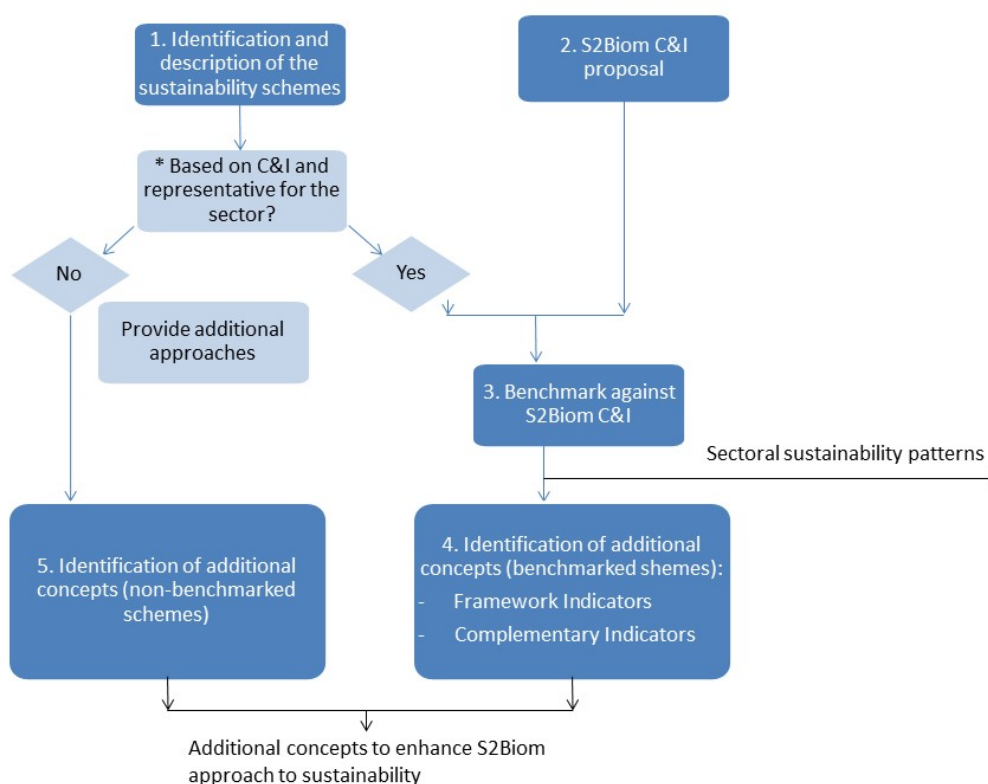
First (step 1), relevant schemes were identified and briefly described (Section 3).

When those schemes were based on sustainability C&I and were representative in the sectors included in this analysis (forestry, agriculture or bioenergy sectors), they were benchmarked (step 3) against the draft S2Biom C&I proposal.

When the schemes did not provide additional points of view to that reflected in benchmarked schemes (steps 3 and 4), but captured other perspectives that might be relevant for the S2Biom approach, the additional requirements were taken into account (step 5).

Schemes targeting specific feedstocks (e.g. forest residues) or schemes under development (e.g. NTA 8080) were included in step 5.

Figure 2 Steps of the Benchmark and Gap Analysis



Source: own elaboration

2.1 Identification of Schemes

The first step was to identify relevant sustainability schemes to be considered in the benchmarking and gap analysis. The schemes were selected with the goal of ensuring:

- Full coverage of a variety of **sectors** related to the bioeconomy: agriculture, forest, bioenergy, waste management, resource efficiency, etc. in order to encompass the range of issues and concerns present within the bioeconomy.
- **A Geographical** scope beyond the EU-28. Although S2Biom is mainly focused on the EU-28 and neighbouring countries, imports of feedstocks or products from non-EU countries are also considered. Thus, international initiatives as well as initiatives in countries outside the EU were taken into account⁷.
- Initiatives promoted from various **bodies and organisms** are covered, including intergovernmental processes, national regulations, and private sector schemes.
- **High representativeness** of the schemes within each sector aiming at covering different relevant approaches.

Additional schemes were examined, but not formally benchmarked for one or several of the following reasons:

- They are sufficiently similar in **structure and content** to other benchmarked schemes. An example of this is some voluntary schemes certifying biofuels and bioliquids for compliance with the EU Renewable Energy Directive -RED- (EU 2009), such as SQC or the Abengoa scheme.
- They target **specific activities** such as forest residue harvesting, providing only specific requirements for these activities while broader supply chains are not considered.
- They are under **revision** so only provisional information is available, as is the case for the Dutch NTA8081 (NEN 2014).

The selected schemes included relevant:

- international schemes,

⁷ S2Biom is seen as an “umbrella” project given support to parallel IEE projects (www.BiomassPolicies.eu and www.BioTrade2020plus.eu).

- sustainability requirements in current legislation and regulations at EU level and in selected Member States (MS),
- voluntary approaches and management practices in selected MS, and
- voluntary certification schemes used in the private sector.

The final list of selected schemes is presented in Section 3.

There are other initiatives, such as those focusing on the reporting of companies on sustainability (e.g., Global Reporting Initiative⁸, UN Global Compact⁹) that are beyond the scope of this report.

Also beyond the present scope, are some of the efforts proposing indicators for the green economy at the country level such as the Green Growth Knowledge Platform (2013), iGrowGreen (EC 2012c) or the European environment — state and outlook (SOER) indicators by European Environment Agency indicators¹⁰ – for EU MS.

This report has considered a broad and comprehensive overview of issues related to sustainability without specific focus on any one the dimensions.

Thus, standards aimed exclusively at one issue, such as environmental management (e.g. ISO 14000 series¹¹) or social responsibility (e.g. ISO 26000¹²), have not been included in this analysis.

2.2 S2Biom Draft Sustainability C&I Proposal

The draft S2Biom sustainability C&I proposal is shown in Section 4.1¹³. This proposal focuses on “mid-point indicators” aimed at capturing the core environmental, social and economic values to be maintained or protected and is composed of 12 criteria and 26 indicators.

This generic proposal aims to provide a framework for use in developing sectoral approaches. Thus, this proposal is meant as an umbrella sustainability set for the

⁸ <https://www.globalreporting.org/Pages/default.aspx>

⁹ <https://www.unglobalcompact.org>

¹⁰ <http://www.eea.europa.eu/soer>

¹¹ <http://www.iso14000-iso14001-environmental-management.com/>

¹² <http://www.iso.org/iso/home/standards/iso26000.htm>

¹³ This is a draft proposal as agreed in the Document of Work and refers to the draft deliverable “S2Biom Task 5.4: Consistent Cross-Sectoral Sustainability Criteria & Indicators” as December 2014.

bioeconomy. In fact, the S2Biom “**mid-point indicators**”¹⁴ identify fundamental sustainability considerations cutting across all sectors for bioeconomy. Where there are considerations specific to one sector or value chain, these were incorporated as “**implementable indicators**”.

In fact, the draft S2Biom proposal targets biodiversity, soil and water (mid-point indicators) but does not specify the amount of residues needed (implementable indicators) to maintain those natural values¹⁵.

2.3 Benchmarking against the S2Biom Proposal

Selected schemes were evaluated in three categories to determine the extent to which they account for the concepts covered by the S2Biom sustainability C&I:

- Indicator **fully** considered (symbol ✓), this means that the main issues of S2Biom indicators are captured by the schemes (units have not been considered).
- Indicator **partially** considered (symbol ~). In this case, the main message is only partially covered by the concept considered in the scheme. Generally, just part of the S2Biom indicator’s message is taken into account or the requirement of the scheme is quite ambiguous.
- Indicator **not** considered (no entry). This category expresses that the concept is not present in the scheme.

Once each scheme was benchmarked, aggregated information by sector was compiled. To consider that an indicator is meaningfully included in a sector, the majority (at least 50 %) of the schemes in the sector should have fully met the given indicator. Given the limitations that this aggregation faces, a category for partially considered indicators has not been proposed. This means that the sectoral compilation only distinguishes between considered/not considered indicators.

Some schemes do not present their requirements in form of indicators¹⁶. Nonetheless, the most “operable” concept (e.g. criteria) were taken into account

¹⁴ See Deliverable 5.4: “Consistent Cross-Sectoral Sustainability Criteria & Indicators”

¹⁵ This will be part of other tasks of WP5.

¹⁶ There are different understandings of the meaning of indicators. According to D5.4 of the project, indicators are: quantitative or qualitative factors or variables providing means to measure achievement, to reflect changes, or to help assess performance or compliance, and - when observed periodically - demonstrate trends. Indicators should convey a single meaningful message (information). Indicators have to be judged on the scale of acceptable standards of performance.

in the benchmarking. For instance, the international FSC scheme for sustainable forest management has not developed its requirements at the indicator level. The indicator level is considered in the adaptation of the scheme to regional or national levels, which is beyond the scope of this report.

For the objectives of this task, we considered that the **requirements** of the FSC international scheme fully comply with the S2Biom C&I proposal, i.e. the requirement to deal with water quality reads “The Organization shall avoid negative impacts on water quality and quantity and mitigate and remedy those that occur” is considered as fully compliant with the S2Biom criterion “water quality”, because it is expected that the FSC indicators to be developed at a regional (or country) level comply with this criterion.

Specific **procedural** differences between schemes are not taken into account here. Schemes may differ in methods for quantifying an indicator, quantitative limits for indicator values, and proposed practices to improve performance against given criteria. For instance, the Sustainability Assessment of Food and Agriculture systems, SAFA (FAO 2013) considers within the concept “Air Pollution” three different indicators: Air Pollution Reduction Target, Air Pollution Prevention Practices and Ambient Concentration of Air Pollutants. The first two indicators are not taken into account in this analysis while the third might be in line with S2Biom indicator “SO₂ equivalents”.

Many schemes have specific requirements about **labour rights**, employment conditions, and overall wellbeing of local communities. These detailed requirements are beyond the scope of this study.

The (external) Annex to this deliverable fully describes the criteria, indicators or concepts considered in the benchmarking for the selected schemes. This does not only include the requirements of the schemes, but sometimes also some additional clarifications to frame the full meaning (such as the wording of the associated criteria or some guidance about the indicator).

For instance, in the Standard for Responsible Soy Production (RTRS 2013a), when searching for information on biodiversity conservation, one of the related indicators is “4.5.1. There is a map of the farm which shows the native vegetation.” We have added the respective criterion before the related indicator, which is “4.5. On farm biodiversity is maintained and safeguarded through the preservation of native vegetation” to contextualise the meaning of the indicator.

When the information provided for any scheme was not relevant or was too detailed, the symbol (...) was used to indicate that some information was omitted.

2.4 Identification and Benchmark of Other Concepts

In parallel to the benchmark and gap analysis against the S2Biom indicators, other concepts of interest for the S2Biom sustainability approach beyond those considered under the C&I proposal were identified. These concepts include indicators or issues that might be complementary to those already developed, taking into account issues associated with specific feedstocks or value chains. These concepts have been categorized as:

Framework indicators: this type of indicator refers to general cross-cutting requirements that might apply to several criteria and indicators included in the S2Biom proposal (e.g. compliance with laws or issues related to planning and monitoring) and that are beyond the scope of the S2Biom indicators.

Complementary indicators: here we include a great variety of requirements found in the schemes. It is indicated where these complementary indicators are related to one or various S2Biom themes or criteria. In this general category we include several “best practices” (i.e. “avoidance of burning” or “responsible management of waste water”) as well as other indicators with a view towards practical application (i.e. determine sustainable potentials or assess the sustainability of value chains). An example of the latter indicators could be “the amount of residues to be left on the ground when harvesting forest residues” that addresses issues related to biodiversity and soils¹⁷.

These concepts were identified by scheme and later were systemized in a single list in order to have a better understanding of the issues of interest in each scheme. These requirements have been systemized (benchmarked) when at least 3 schemes (of the 31 benchmarked schemes) have fully considered them. To consider that any indicator (whenever a “framework indicator” or “complementary indicator”) is meaningfully considered in the analysed schemes, at least 50 % of the schemes should have fully considered it.

Each list of “framework indicators” and “complementary indicators” was further grouped into different topics (equivalent to the S2Biom criterion’s level of information). Section 5 presents the list of these concepts and the annex gives the full description of the performance of the schemes and related requirements.

¹⁷ See Deliverable 5.4 for a more detailed theoretical approach.

2.5 Additional Requirements in Non-Benchmarked Schemes

Description of additional concepts extracted from schemes that could not be benchmarked have been included in section 5. This description could not be systemized, though given the different purposes, approaches and requirements that these schemes have.

3 Identification of Schemes

The schemes considered in this report, as shown in Table 1 are related to:

- The sector to which they apply: This study has taken into account primary and secondary land-based resources from the agriculture, forestry, bioenergy and others (waste, biodiversity, etc.) sectors since those are the resources targeted in the S2Biom project.
- The geographical scope: Country or regional level or management unit level¹⁸.
- The type of initiative: Public or private international or regional initiatives, current legislation and regulation, voluntary certification schemes, voluntary approaches and management practices in selected MS.

Whether these schemes were benchmarked is shown in Table 2.

These initiatives were derived from previous work on this issue (Fritsche et al. 2014; Fritsche & Iriarte 2014; Eppler, Iriarte & Fritsche 2013). Some initiatives (e.g. RSPO, RTRS and Bonsucro) might apply to both the agriculture and bioenergy sector. Given their potential relevance in both sectors, these schemes are included in both sectoral benchmarks.

For the forestry sector, two main types of initiatives have been considered:

- Voluntary forest certification schemes: The international Forest Stewardship Council (FSC) and the Program for the Endorsement of Forest Certification (PEFC) standards have been benchmarked, and additional requirements from Sustainable Forestry Initiative (SFI) have been considered as well (it is under the PEFC umbrella).
- International processes on Sustainable Forest Management (SFM): These systems are often used to guide policy development, monitor and exchange information on national systems for SFM and the design of C&I at more local levels through government activities or private sector certification schemes (Stupak et al. 2011). All these processes address criteria and indicators for forests and forestry at the Country Level¹⁹ with only two of them (International Tropical Timber Organization, and Tarapoto) give requirements at the forest management unit level. These processes have been selected with the aim of

¹⁸ This mainly refers to forests. According to FAO (2000) a “forest management unit” is a well defined and demarcated land area, predominantly covered by forests, managed on a long-term basis and having a set of clear objectives specified in a forest management plan.

¹⁹ The Lepaterique process also provides indicators for the regional level (Latin America) that were deemed as not relevant for the purposes of this report.

reflecting the various challenges of forest land all around the world given that differences, e.g. in voluntary forest certification for woodfuel, might be more significant between countries than between selected schemes (Stupak et al. 2011). The ongoing discussions about the “Legally binding agreement on forests in Europe”²⁰ have not been considered since this agreement is still under negotiations.

Other requirements for specific feedstocks or practices related to forest biomass (e.g. forest residues) are considered under the bioenergy sector.

In the **agricultural sector** the initiatives considered are:

- International processes coordinated by FAO such as SAFA²¹ (FAO, 2013). SAFA is a holistic global framework for the assessment of sustainability along food and agriculture value chains.
- Selected voluntary certification schemes such as Sustainable Agriculture Network (SAN) or voluntary schemes for specific feedstocks such as palm oil (Roundtable on Sustainable Palm Oil - RSPO), soy bean (Roundtable on Responsible Soy - RTRS), or sugarcane (Bonsucro). As recognized by FAO²², there are at least 120 voluntary sustainability standards being implemented by the food and agriculture industry. Many of them are particularly focused on the *quality* of food and feed²³ so they are beyond the scope of this report.
- The requirements of the Common Agricultural Policy and related EU legislation.

Many countries have developed specific regulations for organic agriculture and there are several voluntary certification schemes²⁴. Here we focused on the requirements made at the EU level (EU 2007+2008a). These regulations have not been benchmarked against the S2Biom list of indicators.

With respect to **bioenergy**, different efforts were analysed:

²⁰ <http://www.forestnegotiations.org/>

²¹ <http://www.fao.org/nr/sustainability/sustainability-assessments-safa/en/>

²² Ibid

²³ The website of the International Trade Centre (<http://www.standardsmap.org/>) offers comprehensive information about many different type of standards, including those related to food and feed.

²⁴ http://en.wikipedia.org/wiki/Organic_certification

- International frameworks such as the Global Bioenergy Partnership (GBEP) indicators on sustainability.
- Legislation at the EU level: such as the sustainability requirements included in the RED (EU 2009b).
- EU MS schemes specifically targeting solid bioenergy (Belgium -BE-, Denmark -DK-, The Netherlands -NL-, United Kingdom -UK-).
- Other EU MS regulations covering solid bioenergy
- Regulations in third countries such as United States (US), Mozambique (MZ) and Brazil (BR).
- Voluntary certification schemes: such as the Roundtable on Sustainable Biomaterials -RSB-, the Sustainable Biomass Partnership -SBP- or other schemes targeting specific feedstocks (e.g. RSPO or Bonsucro). Some agriculture and/or bioenergy standards have adapted their schemes to certify compliance with the EU RED (e.g. RSPO, RTRS, or Bonsucro).
- Different types of voluntary guidelines:
 - For forest residue harvesting
 - Guidelines for ash recycling
 - Guidelines for woodwaste combustion

Some considerations have to be kept in mind:

- For biofuels and bioliquids, most EU MS have adopted the sustainability requirements laid out under the RED applying the same sustainability requirements (CNE 2012) and adopted the Fuel Directive Quality (EU 2009b). However, the draft revision of the NTA8081 (NEN 2014) proposes stricter sustainability criteria than the specific EU directives (i.e. RED and FQD). Given the potential impact of NTA8081 requirements, they are considered here, even though they are still under consideration.
- For solid biomass (including agricultural and forestry biomass) a formal, EU-wide, sustainability framework is lacking (EC 2014a). Nonetheless, it bears noting that:
 - Likely, many sustainability requirements and strategy documents are included in other European initiatives (i.e. EU Biodiversity Strategy (EP 2012), EU Forest Strategy (EC 2013), EU Timber Regulation (EU 2010), etc.). These might apply to EU sourced

biomass and that produced somewhere else. Furthermore, there is different sectoral legislation at the MS level²⁵.

- The most relevant (mainly) pellet importing countries in the EU (i.e. UK, NL, BE and DK) are developing their own regulations to assure sustainability of bioenergy carriers. UK and BE have passed regulations, while those in NL and DK are still under development. In light of the efforts made in NL (NEN 2014) to extend the sustainability requirements from the bioenergy sector to the bio-economy in general (including bio-products), relevant requirements of the draft NTA8081 have been included, as indicated above.

As previously mentioned, three schemes (RSPO, RTRS and Bonsucro) are feedstock-specific (palm oil, soy and sugarcane, respectively) and were originally developed to assure responsible/sustainable cultivation of the feedstock for food purposes. Later, these schemes were adapted in order to comply with the EU-RED sustainability requirements for biofuels and bioliquids. Required adaptations have been different for each scheme:

- RSPO RED (RSPO 2013a). The requirements for compliance with the EU RED have been designed as voluntary add-on to the RSPO standard. This separate document has to be used in conjunction with the RSPO Principles & Criteria (RSPO 2013b), the RSPO Certification System requirements, the RSPO Supply Chain Certification System requirements and the RSPO Supply Chain Certification Standard.
- RTRS EU RED requirements (2013a) is provided as an additional document which allows soy producers and processors to meet the requirements for supplying soy-based biofuels to EU MS. Producers (growers) seeking to comply with the RTRS EU RED scheme must as well demonstrate compliance with the RTRS Standard for Responsible Soy Production (2013b) besides other mandatory documents (RTRS 2011).
- Bonsucro EU is the Bonsucro certification option that complies with Bonsucro requirements plus additional requirements that are needed for EU RED compliance. Within the Bonsucro Certification System documents (i.e. Standards, Guidance, and Certification Protocol) the extra Bonsucro EU

²⁵ WP6 of the S2Biom project “Regulatory & financial framework to mobilise non-food biomass to biobased products & bioenergy market” is elaborating a comprehensive database of the different regulations at the EU level, in MS and neighbouring countries.

requirements are clearly marked. In the case of the production standard (Bonsucro 2014) they are described as section 6 of the same document.

The main differences between the agriculture and bioenergy (RED-compliant) standards of these three schemes are found in the indicators related to GHG emissions along the value chain (S2Biom indicator 2.1) and protected areas and land with significant biodiversity values (S2Biom indicator 3.1). The details of these indicators, even if relevant in their various implications, are beyond the scope of this report.

RSB and NTA8081 have been benchmarked within the bioenergy sector even though they are intended to apply to both bioenergy and bio-products. This is similar for the International Sustainability and Carbon Certification (ISCC)²⁶, which is a voluntary certification scheme applicable for all types of biomass and biomass-based products. Complementary to ISCC-EU aimed to show biofuels sustainability with regard to the RED, ISCC PLUS has been developed for food, feed, technical/chemical applications (e.g. bioplastics) and other bioenergy applications (e.g. solid biomass). All the sustainability core requirements of the various ISCC standards (EU, DE, PLUS) are aligned.

The ISCC PLUS is composed of a list of relevant references whose contents have to be considered (obligatory requirements are indicated with an asterisk):

- ISCC PLUS 201 System Basics
- ISCC PLUS 202 Sustainability Requirements – ISCC PLUS Standard on Sustainability*
- ISCC PLUS 202a Sustainability Requirements – Equivalence Benchmark
- ISCC PLUS 203 Requirements for Traceability*
- ISCC PLUS 204-01 Mass balance requirements*
- ISCC PLUS 204-02 Physical Segregation requirements*

Additionally to the core requirements of ISCC PLUS, interested parties can chose from a set of voluntary add-ons:

- ISCC PLUS 202-01 Environmental Management and Biodiversity
- ISCC PLUS 202-02 Classified Chemicals

²⁶ <http://www.iscc-system.org/en/iscc-system/about-iscc/>

- ISCC PLUS 205-01 GHG Emission Requirements. While for biofuels (ISCC-EU) compliance with this requirement is mandatory (ISCC 2011), for other biomass feedstocks (ISCC PLUS) it is only mandatory for the biomass production and must be available at the first gathering point (ISCC 2012). All other elements in the value chain can choose this add-on (205-01) as a modular approach.
- ISCC PLUS 205-02 Consumables of a Production Process

Moreover, for some types of biomass or biomass-based products special ISCC PLUS requirements are defined as special requirements or audit procedures. These special requirements must be applied together with the overall ISCC PLUS standard. Several extensions have been developed for various purposes:

- ISCC PLUS 260-01 – Short Rotation Coppices
- ISCC PLUS 260-02 – Bioplastics
- ISCC PLUS 260-03 – Feed
- ISCC PLUS 260-04 – Food
- ISCC PLUS 260-05 - Waste fuels, renewable fuels of non-biological origin

This benchmark has considered the ISCC-EU (2015) version 2.4, obligatory from 01 January 2015.

RSB has also developed two sets of standards that describe sustainability requirements: the global set of standards, and the RSB EU-RED consolidated standards. The global set of standards applies to any type of feedstock worldwide whereas the RSB EU-RED consolidated standards is an adaptation of the RSB standards developed for compliance with the RED, which defines the land-use and GHG criteria for biofuels entering the EU market. This study has focused on the global set of standards because documentation differences between both of them are not relevant for the purpose of this work.

There are regulations in third countries such as the Renewable Fuel Standard in the US, the Environmental zoning in Brazil (CENBIO 2013) and the national biofuels policy and strategy of Mozambique (Schut, Slingerland, Locke 2010) that add other angles to the analysis. Those initiatives are extensively discussed in section 5.3.

Furthermore, ISO²⁷ is in the process of developing a sustainability standard for bioenergy, though it is not yet operational. This standard will cover the production, supply chain, and application of bioenergy.

There are also **other regulations** that directly or indirectly apply to bioeconomy such as:

- The **EU Biodiversity Strategy** (EU 2012), that calls on the Commission to develop reliable indicators of environmental sustainability in order to assess the degree of progress towards the overall goal of protecting biodiversity.
- The **EU Waste Directive** (EU 2008b), which regulates different considerations for wastes and by-products that might be relevant for some biomass-value chains.
- The **Resource Efficiency** Scoreboard (EC 2014b) presents indicators covering themes and subthemes of the Roadmap to a Resource Efficient Europe (EC 2011). This Roadmap indicated the necessity to develop adequate indicators and targets for guiding actions and monitoring progress. The Scoreboard had identified a total of 5 themes, 12 sub-themes and 17 indicators. Several of these indicators clearly overlap the S2Biom proposal (e.g. those related to soils and water), while others might provide additional points of view (see section 5.3).
- The Action Plan of the **Bioeconomy** Strategy for EU (EC 2012a), points out that the Action Plan should support the future development of standardized sustainability assessment methodologies for bio-based products and food production systems, including environmental footprints, e.g. using life cycle assessments”. Moreover, the Commission Staff Working Document (EC 2012b) analyses different scenarios and considers various requirements that might be of interest (see section 5.3).
- The **German Biorefinery** Roadmap (BMELV 2012) specifically considers sustainability issues not only on the supply side but also with respect to biomass use.
- The **CEN TC411 Bio-Based Products**²⁸ is also working on the development of horizontal standards for bio-based products, which are not yet available.

²⁷

http://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees/iso_technical_committee.htm?commid=598379

²⁸ <http://www.biobasedeconomy.eu/standardisation/cen-tc411/wg4/>

It is worth noting that in this work the schemes' documents regarding administrative procedures to certify value chains have not been considered.

Table 1 Identified Schemes and Regulations in Biomass Supply and Use Sectors

Scheme or Regulation	Reference	Sector	Geographical scope	Type of scheme
SAFA- Sustainability Assessment of Food and Agriculture systems	FAO 2013	Agriculture	International	International voluntary sustainability assessment
SAN- Sustainable Agriculture Network	SAN 2010	Agriculture	International	Voluntary certification
RSPO- Roundtable on Sustainable Palm Oil (Agriculture + Bioenergy)	RSPO 2013a+b	Agriculture	International	Voluntary certification
RTRS- Round Table on Responsible Soy (Agriculture + Bioenergy)	RTRS 2013a+b	Agriculture	International	Voluntary certification
Bonsucro- Better Sugarcane Initiative (Agriculture + Bioenergy)	Bonsucro 2014	Agriculture/Bioenergy	International	Voluntary certification
CAP- Common Agricultural Policy	EU 2013a-c; EU 2014a+b	Agriculture	EU-28	EU legislation
EU organic production	EU 2007+ 2008a	Agriculture	EU-28	EU legislation
FSC- Forest Stewardship Council	FSC 2014	Forest	International	Voluntary certification
PEFC- Programme for the Endorsement of Forest Certification	PEFC 2012	Forest	International	Voluntary certification
SFI- Sustainable Forestry Initiative	SFI 2015	Forest	North America	Voluntary certification
Tarapoto (Forest Management Unit level and National Level)	FAO 2008	Forest	International	International process
ITTO- International Tropical Timber Organization (Forest Management Unit level and Country Level)	FAO 2008	Forest	International	International process
ASI- Regional Initiative for the Development and Implementation of National Level Criteria and Indicators for the Sustainable Management of Dry Forests in Asia (Country Level)	FAO 2008	Forest	International	International process

Scheme or Regulation	Reference	Sector	Geographical scope	Type of scheme
ATO- African Timber Organization (Country Level)	FAO 2008	Forest	International	International process
CILSS- Permanent Interstate Committee for Drought Control in the Sahel (Country Level)	FAO 2008	Forest	International	International process
SADC- Southern African Development Community (Country Level)	FAO 2008	Forest	International	International process
Lepaterique (Country Level)	FAO 2008	Forest	International	International process
Near East Process (Country Level)	FAO 2008	Forest	International	International process
MCFPE- Ministerial Conference on the Protection of Forests in Europe (Forest Europe) (Country Level)	FAO 2008	Forest	International	International process
Montreal Process (Country Level)	FAO 2008	Forest	International	International process
EU Forest Strategy	EU 2103	Forest	EU level	EU Strategy
EU Timber Regulation	EU 2010	Forest	EU level	EU Regulation
GBEP- Global Bioenergy Partnership	GBEP 2011	Bioenergy	International	International process
RED – EU Renewable Energy Directive	EU 2009a	Bioenergy	EU level	EU Regulation
National schemes for solid bioenergy (BE, DK, NL, UK)	Pelkmans et al. 2012; Iriarte, Fritsche, Pelkmans et al 2014a; NEN 2014	Bioenergy	EU country level	EU regulations
Other EU MS regulations related to solid bioenergy	Pelkmans et al. 2012	(Related to bioenergy)	EU country level	EU MS regulations or guidelines
Non-EU countries bioenergy regulations	e.g. Goovaerts et al. 2013; CENBIO 2013; Schut, Slingerland, Locke 2010	Bioenergy	National various	Non-EU regulations
Voluntary guidelines for forest residue harvesting	Fritsche et al. 2014	(Forest) Bioenergy	National (various)	Voluntary guidelines

Scheme or Regulation	Reference	Sector	Geographical scope	Type of scheme
Guidelines for ash recycling	Swedish Forest Agency 2008	(Forest) Bioenergy	Sweden	EU MS guidelines
Guidelines for woodwaste combustion	Alakangas 2014	(Forest) Bioenergy	Finland	EU MS guidelines
RSB- Roundtable on Sustainable Biomaterials	RSB 2010+2011	Bioenergy (include bioproduct)	International	Voluntary certification
SBP- Sustainable Biomass Partnership	SBP 2014	Bioenergy	International	Voluntary certification
Greenenergy	Greenenergy 2011	Bioenergy	International	Voluntary certification
ISCC EU- International Sustainability and Carbon Certification	ISCC 2015	Bioenergy (include bioproducts)	International	Voluntary certification
GGL-Agri- Green Gold Label Program. Agricultural source	GGL 2013a	Bioenergy	International	Voluntary certification
GGL-Forest- Green Gold Label Program. Forest Management	GGL 2013b	Bioenergy	International	Voluntary certification
EU Biodiversity Strategy	EU 2012	Other	EU level	EU Strategy
EU Waste Directive	EU 2008b	Other	EU level	EU Legislation
EU Resource Efficiency Strategy	EC 2011	Other	EU level	EU Strategy
EU Bioeconomy Strategy	EC 2012a	Other	EU level	EU Strategy
German Biorefinery Roadmap	BMELV 2012	Other	EU MS	MS Strategy

Source: own compilation; FMU = Forest Management Unit; CL = Country level; MS = Member State

Table 2 Overview of benchmarked and non-benchmarked schemes by sectors

	Agriculture	Forest	Bioenergy	Others
Benchmarked	SAFA- Sustainability Assessment of Food and Agriculture systems	FSC- Forest Stewardship Council (FMU)	GBEP- Global Bioenergy Partnership	
	SAN- Sustainable Agriculture Network	PEFC- Programme for the Endorsement of Forest Certification (FMU)	RED – EU Renewable Energy Directive	
	RSPO- Roundtable on Sustainable Palm Oil (Agri)	Tarapoto (FMU + CL)	RSB- Roundtable on Sustainable Biomaterials	
	RTRS- Round Table on Responsible Soy (Agri)	ITTO - International Tropical Timber Organization (FMU + CL)	SBP- Sustainable Biomass Partnership	
	Bonsucro- Better Sugarcane Initiative (Agri + Bioenergy)	ASI - Regional Initiative for the Development and Implementation of National Level Criteria and Indicators for the Sustainable Management of Dry Forests in Asia	RSPO- Roundtable on Sustainable Palm Oil (Bioenergy)	
	CAP- Common Agricultural Policy	ATO - African Timber Organization (CL)	RTRS- Round Table on Responsible Soy (Bioenergy)	
		CILSS- Permanent Interstate Committee for Drought Control in the Sahel (CL)	Bonsucro (Agri+Bio)	
		SADC- Southern African Development Community (CL)	Greenenergy	
		Lepaterique CL	ISCC-EU International Sustainability and Carbon Certification	
		Near East Process (CL)	GGL-Agri- Green Gold Label Program. Agricultural source	
	MCFPE - Ministerial Conference on the Protection of	GGL-Forest- Green Gold Label Program. Forest Management		

	Agriculture	Forest	Bioenergy	Others
		Forests in Europe (Forest Europe) (CL)		
		Montreal Process (CL)		
Non-Benchmarked	EU organic production	SFI – Sustainable Forestry Initiative	National schemes for solid bioenergy (BE, DK, NL, UK)	EU Biodiversity Strategy
		EU Forest Strategy	Other EU MS regulations related to solid bioenergy	EU Waste Directive
		EU Timber Regulation	Non-EU countries bioenergy regulations	EU Resource Efficiency Strategy
			Voluntary guidelines for forest residue harvesting	EU Bioeconomy Strategy
			Guidelines for ash recycling	German Biorefinery Roadmap
			Guidelines for wood waste combustion	

Source: own compilation

4 Benchmark and Gap Analysis

The benchmark and gap analysis has been performed evaluating the relevant schemes structured as criteria and indicators against the draft S2Biom structure (see Table 3). Results of this analysis are presented first as a compilation by sector (see Table 4) and later the performance of each scheme in the respective sector (see Tables 5-7).

4.1 S2Biom C&I Proposal

The draft Sustainability C&I Proposal in the framework of the S2Biom project (version December 2015) is presented in Table 3.

A final version of the Sustainability C&I is given in Deliverable 5.4 of the project (Consistent Cross-Sectoral Sustainability Criteria & Indicators), encompassing the environmental (including resource efficiency issues), social, and economic themes and is composed of 12 criteria and 26 mid-point indicators.

Table 3 Draft Sustainability Criteria and Indicators for the Bioeconomy as Proposed in the framework of the S2Biom project

Theme	Criterion	Indicator		
		#	Indicator name	Description
Environment	1. Resource efficiency	1.1	Land use efficiency	Available bioenergy carriers (including by- and co-products along the bioenergy life cycles) per hectare of cultivated area
		1.2	Secondary resource efficiency	Heating value of the bioenergy output divided by the heating value of the secondary resource. This indicator applies to bioenergy carriers stemming from the conversion of secondary biomass resources such as residues and wastes.
		1.3	Energy efficiency	Cumulative energy demand (all inputs (based on LHV primary energy), incl. renewable energy and biomass input, compared to the outputs
		1.4	Functionality (output service quality)	Economic value of the outputs (€/GJ x GJ energy carriers + €/ton x ton materials), compared to the economic value of the heat which could be produced from burning the (dried) primary inputs (reference = heat from NG ~ 10€/GJ); economic values are excl. tax, for industrial customers
	2. Climate change	2.1	Life cycle GHG emissions (CO ₂ eq), including direct LUC	GHG emissions during crop growth & harvesting, logistics, pretreatment and conversion, distribution, end use; in relation to the final output (combination of electricity, useful heat, biofuels & biomaterials)
		2.2	Other GHG emissions	GHG from iLUC and C stock changes
	3. Biodiversity	3.1	Protected areas and land with significant biodiversity values	Categories established by the RED
		3.2	Biodiversity conservation and management	"Agrobiodiverse cultivation" (crop rotation; diversity in the landscape; avoidance of alien species) and amount of chemicals (pesticides/herbicides); release of GMO

Theme	Criterion	Indicator		
		#	Indicator name	Description
	4. Soil	4.1	Erosion	Probability of erosion where mitigation measures are not feasible
		4.2	Soil Organic C	Probability of soil organic C loss where mitigation measures are not feasible (it depends on the type of crops - perennials and annual crops- and respective land management)
		4.3	Soil nutrient balance	Probability of nutrient balance loss where mitigation measures are not feasible
	5. Water	5.1	Water availability and regional water stress	Water use in relation to TARWR (total actual renewable water resources), or average replenishment from natural flow in a watershed
		5.2	Water use efficiency	Water use for biomass production (cropping) + irrigation + processing
		5.3	Water quality	Water quality: water pollution (nitrate, phosphorous, pesticides, BOD)
	6. Air	6.1	SO ₂ equivalents	Life cycle emissions of SO ₂ , NO _x , NH ₃ and HCl/HF from bioenergy requirement, expressed in SO ₂ equivalents and calculated in accordance to the life cycle emission methodology for GHG
		6.2	PM ₁₀	Life cycle emissions of PM ₁₀ from bioenergy requirement, calculated in accordance to the life cycle emission methodology for GHG
	Social	7. Participation and transparency	7.1	Effective participatory processes
7.2			Information transparency	Documentation necessary to inform stakeholder positions shall be made freely available to stakeholders in a timely, open, transparent and accessible manner
8. Secure tenure of land		8.1	Compliance with the VGGT (CFS 2012) to secure land tenure and ownership	Share of area or share of biomass that could be under secure land tenure, based on literature revision and national (or international) statistics.

Theme	Criterion	Indicator		
		#	Indicator name	Description
	9. Employment and labour conditions	9.1	Full direct jobs equivalents along the full value chain	Number of jobs from bioenergy
		9.2	Full direct jobs equivalent in the biomass consuming region (or country)	Number of jobs from bioenergy
		9.3	Human and Labour Rights	Adherence to ILO (1998) principles and voluntary standards. Not all countries are signatories of ILO
		9.4	Occupational safety and health for workers	Measures taken to guarantee occupational safety and health for workers
	10. Health risks	10.1	Risks to public health	Measures taken to safeguard public health, i.e. regulation of noise level and accidents
	11. Food security	11.1	Risks for negative impacts on price and supply of national food basket and fuelwood	This indicator needs to be fully described and will consider the BEFS methodology (FAO 2014) and literature references
Economic	12. Production costs	12.1	Levelised life-cycle cost (excl. subsidies, incl. CAPEX, OPEX)	Levelised life-cycle cost, excluding subsidies

Source: own elaboration

4.2 Benchmark and Gap Analysis

Aggregated results²⁹ of the benchmarking process for all of the schemes considered against the draft S2Biom C&I (26 indicators) are presented in Table 4. The agriculture sector covered more S2Biom indicators (17) in a meaningful way than the bioenergy (12) and forestry sectors (9). All sectors presented a better performance against the indicators under the environmental theme than in the social theme whilst the economic side was not meaningfully considered in any sector.

As shown in this table, Table 4, biodiversity, soil and secure tenure of land are fully covered in the schemes and sectors analysed. Thus, seven S2Biom indicators are considered in all sectors, as follows:

- Protected areas and land with significant biodiversity values
- Biodiversity conservation and management
- Erosion
- Soil Organic C
- Soil nutrient balance
- Water availability and regional water stress
- Compliance with the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (CFS 2012).

Indicators related to climate change, water, participation and transparency as well as employment and labour conditions are partially covered. In particular, the following 6 S2Biom indicators are meaningfully included in two sectors:

- Life-cycle GHG (CO₂eq) emissions, including direct land use change (LUC)
- Water use efficiency
- Water quality
- Effective participatory processes
- Human and Labour Rights

²⁹ For an indicator to be considered in a sector, at least 50 % of the schemes should have covered the respective requirement in a meaningful way.

- Occupational safety and health for workers

The following 5 S2Biom indicators are only taken into account significantly in one sector:

- Energy efficiency
- Effective participatory processes
- Information transparency
- Full direct jobs equivalent in the biomass consuming region (or country), and
- Risks to public health

Moreover, there are 8 S2Biom indicators that are not significantly reflected in any sector:

- Land use efficiency
- Secondary resource efficiency
- Functionality (Output service quality)
- Other GHG emissions
- SO₂ equivalents
- PM₁₀
- Risks for negative impacts on price and supply of national food basket and fuelwood.
- Levelised life-cycle cost (excluding subsidies, including CAPEX, OPEX)

If focusing on voluntary certification schemes targeting the project level, the same pattern as for the overall sectoral analysis is found. Thus, the indicators meaningfully considered within those schemes are the indicators included in 2 or 3 sectors as described above.

When closely looking at the differences between the agriculture and bioenergy sector, it could be concluded that these differences are minimum. Thus, those indicators that are covered by the agriculture sector and not meaningfully taken into account in the bioenergy one (Energy efficiency, Effective participatory processes, Information transparency, and Full direct jobs equivalent in the biomass consuming region (or country)) are also considered in several of the bioenergy schemes even if not in a meaningful way.

Furthermore, when looking at the forest certification schemes selected for the benchmarking (FSC and PEFC), there are additional indicators to those

mentioned above that are relevantly included such as: water quality, Information transparency, Full direct jobs equivalent in the biomass consuming region (or country), Human and Labour Rights, occupational safety and health for workers.

These results should be carefully analysed given the limitations of this analysis (i.e. the selected schemes for each sector might not reflect the majority of the volumes/amount of biomass used in each sector). Nevertheless, this compilation results helpful to better understand the patterns in forestry, agriculture and bioenergy. The non-inclusion of some indicators in these sectors might respond to several issues. For example, with respect to indicators related to the resource efficiency criterion, it is only recently that the discussion on this topic gained momentum so there has not been time to deeply discuss (and incorporate if appropriate) these requirements in the respective schemes (or regulations). Other requirements, as i.e. with respect to the Air criterion might be reflected in other legislation.

Table 5 shows the benchmark and gap analysis for the selected forestry sector schemes against the draft S2Biom indicators. Environmental criteria with the exception of resource efficiency and climate change are well covered within the schemes analysed³⁰. Nonetheless, new developments in the framework of the forestry sector at the EU level such as the EU Forest Strategy (EU 2013) captures the need to consider resource efficiency in the forest sector. Particularly, the EU Forest Strategy points out that an option to improve the resource efficiency in this sector is the cascade use of wood³¹ (see Section 5.3).

The SFI (2015) just released the “Forest Management Standard” and the “Fiber Sourcing Standard”. There is a requirement with respect to the “Efficient Use of Fiber Resources (objective 7)” which aims to minimize waste and ensure the efficient use of fibre resources. For this, “Program Participants shall employ appropriate forest harvesting technologies and in-woods manufacturing processes and practices to minimize waste and ensure efficient utilization of harvested trees (...)”.

In fact, different requirements with respect to the forestry sector are appearing in the last developments.

³⁰ The role of forest with regard to climate change is discussed within the framework indicators See FW16 “Maintenance of forest contribution to global carbon cycles”.

³¹ According to the EC (2013), under the cascade principle, wood is used in the following order of priorities: wood-based products, extending their service life, re-use, recycling, bio-energy and disposal.

Social criteria are only partially considered, while economic criteria are not taken into account in the forestry sector. One of the reasons that might explain this lack of coverage for these themes is that many of the schemes analysed correspond to international forest processes on C&I for SFM so they address issues of interest at the national level. However, they consider other concepts of relevance for the S2Biom approach (see Section 5).

The results of the benchmark and gap analysis for the agricultural schemes is shown in Table 6. The agriculture schemes selected cover most of the S2Biom indicators, particularly for the environmental and social themes. Many schemes address the energy efficiency indicator, contrary to what occurs for the forest schemes. No scheme covers food security issues while the cost of production is only considered in one scheme.

A similar pattern as for the agriculture is observed for the selected schemes related to bioenergy, as shown in Table 7. Nonetheless, there are more indicators covered in the agriculture sector than in the bioenergy one.

With regards to bioenergy, in the EU there are a number of legal measures addressing environmental issues such as air pollution (see e.g. EC 2014a) so even if this issue is not directly covered under the RED or the Common Agricultural Policy, this and other environmental issues might be covered under other pieces of legislation.

Table 4 Compilation of the Benchmark and Gap analysis of the selected Schemes and Regulations against the (draft) S2Biom Indicators

Theme	Criterion	Indicator		Sector			
		#	Indicator name	Forestry	Agriculture	Bioenergy	
Environmental	1. Resource efficiency	1.1	Land use efficiency				
		1.2	Secondary resource efficiency				
		1.3	Energy efficiency		✓		
		1.4	Functionality (output service quality)				
	2. Climate change	2.1	Life cycle GHG emissions (CO ₂ eq), including direct LUC		✓	✓	
		2.2	Other GHG emissions				
	3. Biodiversity	3.1	Protected areas and land with significant biodiversity values	✓	✓	✓	
		3.2	Biodiversity conservation and management	✓	✓	✓	
	4. Soil	4.1	Erosion	✓	✓	✓	
		4.2	Soil Organic C	✓	✓	✓	
		4.3	Soil nutrient balance	✓	✓	✓	
	5. Water	5.1	Water availability and regional water stress	✓	✓	✓	
		5.2	Water use efficiency		✓	✓	
		5.3	Water quality		✓	✓	
	6. Air	6.1	SO ₂ equivalents				
		6.2	PM ₁₀				
	Social	7. Participation and transparency	7.1	Effective participatory processes	✓	✓	
			7.2	Information transparency		✓	
8. Secure land tenure		8.1	Compliance with the VGGT to secure land tenure and ownership	✓	✓	✓	

Theme	Criterion	Indicator		Sector		
		#	Indicator name	Forestry	Agriculture	Bioenergy
	9. Employment and labour conditions	9.1	Full direct jobs equivalents along the full value chain	✓		
		9.2	Full direct jobs equivalent in the biomass consuming region (or country)		✓	
		9.3	Human and Labour Rights		✓	✓
		9.4	Occupational safety and health for workers		✓	✓
	10. Health risks	10.1	Risks to public health		✓	
	11. Food security	11.1	Risks for negative impacts on price and supply of national food basket and fuelwood.			
Economic	12. Production costs	12.1	Levelised life-cycle cost (excluding subsidies, including CAPEX, OPEX)			

Source: own compilation.

Note: It has been considered that a sector takes into account any of the S2Biom indicators when at least 50 % of the schemes in the sector consider the given indicator fully.

Table 5 Benchmark and Gap analysis of the selected Forest Schemes against the (draft) S2Biom Indicators

Theme	Criterion	Indicator		FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal	
		#	Indicator name															
ENVIRONMENTAL	1. Resource efficiency	1.1	Land use efficiency															
		1.2	Secondary resource efficiency															
		1.3	Energy efficiency															
		1.4	Functionality (output service quality)															
	2. Climate change	2.1	Life cycle GHG emissions (CO ₂ eq), including direct LUC															
		2.2	Other GHG emissions															
	3. Biodiversity	3.1	Protected areas and land with significant biodiversity values	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		3.2	Biodiversity conservation and management	✓	✓	✓	✓	✓	✓	✓	✓	✓	~	~	~	~	✓	✓
	4. Soil	4.1	Erosion	✓	✓	✓	✓	✓	✓	✓	✓	✓			~	✓	✓	✓
		4.2	Soil Organic C	✓	✓	✓		✓						✓	~	✓	✓	✓
		4.3	Soil nutrient balance	✓	✓	✓	~	~	~			~	✓	✓	~	✓	✓	~
	5. Water	5.1	Water availability and regional water stress	✓	✓	✓		✓			✓	✓	✓	✓	✓		✓	✓
		5.2	Water use efficiency															
		5.3	Water quality	✓	✓						✓	✓		✓	~			✓
	6. Air	6.1	SO ₂ equivalents	~														
		6.2	PM ₁₀	~														

Theme	Criterion	Indicator		FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal	
		#	Indicator name															
SOCIAL	7. Participation and transparency	7.1	Effective participatory processes	✓	✓	✓	✓	✓	✓	~	✓	✓	✓	✓	✓	~	~	
		7.2	Information transparency	✓	✓			~				✓						
	8. Secure tenure of land	8.1	Compliance with the VGGT to secure land tenure and ownership	✓	✓		✓		✓		✓	✓	✓	✓		✓	✓	
	9. Employment and labour conditions	9.1	Full direct jobs equivalents along the full value chain					✓		✓		✓	✓		✓	✓	✓	
		9.2	Full direct jobs equivalent in the biomass consuming region (or country)*	✓	✓	✓						✓	✓		✓			
		9.3	Human and Labour Rights	✓	✓							~			✓			
		9.4	Occupational safety and health for workers	✓	✓		✓		✓		✓						✓	
	10. Health risks	10.1	Risks to public health	~	~													
11. Food security	11.1	Risks for negative impacts on price and supply of national food basket and fuelwood								~		~	~		~			
ECONOMIC	12. Production costs	12.1	Levelised life-cycle cost (excluding subsidies, including CAPEX, OPEX)															

Source: own compilation

Note: FMU = Forest Management Unit; CL = Country level

Table 6 Benchmark and Gap analysis of the selected Agricultural Schemes against the (draft) S2Biom Indicators

Theme	Criterion	Indicator		SAFA	SAN	RSPO	RTRS	Bonsucro	CAP
		#	Indicator name						
ENVIRONMENTAL	1. Resource efficiency	1.1	Land use efficiency						
		1.2	Secondary resource efficiency						
		1.3	Energy efficiency	~	✓	✓		✓	✓
		1.4	Functionality (output service quality)						
	2. Climate change	2.1	Life cycle GHG emissions (CO ₂ eq), including direct LUC	✓	~	✓	✓	✓	✓
		2.2	Other GHG emissions	~					
	3. Biodiversity	3.1	Protected areas and land with significant biodiversity values	~	✓	✓	✓	✓	✓
		3.2	Biodiversity conservation and management	✓	✓	✓	✓	✓	✓
	4. Soil	4.1	Erosion	~	✓	✓	✓	~	✓
		4.2	Soil Organic C	✓	✓	✓	✓	~	✓
		4.3	Soil nutrient balance	✓	✓	✓	✓	~	
	5. Water	5.1	Water availability and regional water stress	✓	✓	✓	✓		✓
		5.2	Water use efficiency	✓	✓	✓		✓	✓
		5.3	Water quality	✓	✓	✓	✓	✓	✓
6. Air	6.1	SO ₂ equivalents	~		✓		✓		
	6.2	PM ₁₀	~		✓		✓		
SOCIAL	7. Participation and transparency	7.1	Effective participatory processes	✓		✓	~	✓	
		7.2	Information transparency	✓	✓	✓	~	✓	
	8. Secure tenure of land	8.1	Compliance with the VGGT to secure land tenure and ownership	✓	✓	✓	✓	✓	
	9. Employment and labour conditions	9.1	Full direct jobs equivalents along the full value chain						
		9.2	Full direct jobs equivalent in the biomass consuming region (or country)*	✓	✓		✓		

Theme	Criterion	Indicator		SAFA	SAN	RSPO	RTRS	Bonsucro	CAP
		#	Indicator name						
		9.3	Human and Labour Rights	✓	✓	✓	✓	✓	
		9.4	Occupational safety and health for workers	✓	✓	✓	✓	✓	
	10. Health risks	10.1	Risks to public health	✓	✓		✓		~
	11. Food security	11.1	Risks for negative impacts on price and supply of national food basket and fuelwood						
ECONOMIC	12. Production costs	12.1	Levelised life-cycle cost (excluding subsidies, including CAPEX, OPEX)	✓					

Source: own compilation

Note: FMU = Forest Management Unit; CL = Country level

Table 7 Benchmark and Gap Analysis of the selected Bioenergy Schemes against the (draft) S2Biom Indicators

Theme	Criterion	Indicator		GBEP	RED	RSB	SBP	RSPO	RTRS	Bonsucro	Greenenergy	ISCC-EU	GGL-Agri	GGL-Forest	
		#	Indicator name												
ENVIRONMENTAL	1. Resource efficiency	1.1	Land use efficiency												
		1.2	Secondary resource efficiency												
		1.3	Energy efficiency	✓	~			✓		✓				✓	✓
		1.4	Functionality (output service quality)												
	2. Climate change	2.1	Life Cycle GHG emissions (CO ₂ eq), including direct LUC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		2.2	Other GHG emissions				✓								
	3. Biodiversity	3.1	Protected areas and land with significant biodiversity values	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		3.2	Biodiversity conservation and management	✓	~	✓	✓	✓	✓	✓	✓	✓	✓		✓
	4. Soil	4.1	Erosion	✓	~	✓	~	✓	✓	✓	~	✓	✓	✓	✓
		4.2	Soil Organic C	✓	~	✓	✓	✓	✓	✓	~	✓	✓	✓	~
		4.3	Soil nutrient balance	✓		✓	✓	✓	✓	✓	~	✓	✓	✓	~
	5. Water	5.1	Water availability and regional water stress	✓	~	✓	✓	✓	✓	✓		~	✓	✓	
		5.2	Water use efficiency	✓	~	✓		✓			✓	✓	✓	✓	
		5.3	Water quality	✓	~	✓	~	✓	✓	✓	✓	✓	✓	✓	
	6. Air	6.1	SO ₂ equivalents	✓		✓	~	✓			✓	~			
		6.2	PM ₁₀	✓		✓	~	✓			✓	~			
	SOCIAL	7. Participation and transparency	7.1	Effective participatory processes	~		✓		✓	~	✓	✓	~	✓	
			7.2	Information transparency	~		✓		✓	~	✓	~	~		

Theme	Criterion	Indicator		GBEP	RED	RSB	SBP	RSPO	RTRS	Bonsucro	Greenenergy	ISCC-EU	GGL-Agri	GGL-Forest	
		#	Indicator name												
	8. Secure tenure of land	8.1	Compliance with the VGGT to secure land tenure and ownership	✓		✓	✓	✓	✓	✓	✓	✓		✓	
	9. Employment and labour conditions	9.1	Full direct jobs equivalents along the full value chain	✓									~		
		9.2	Full direct jobs equivalent in the biomass consuming region (or country)	✓		✓	✓		✓						
		9.3	Human and Labour Rights			✓	✓	✓	✓	✓	✓	✓	✓		
		9.4	Occupational safety and health for workers	✓		✓	✓	✓	✓	✓	✓	✓	✓		
	10. Health Risks	10.1	Risks to public health	✓	~	✓			✓			✓			
11. Food security	11.1	Risks for negative impacts on price and supply of national food basket and fuelwood.	✓		~	✓						✓	✓		
ECONOMIC	12. Production costs	12.1	Levelised life-cycle cost (excluding subsidies, including CAPEX, OPEX)	✓											

Source: own compilation

5 Other Relevant Concepts

5.1 Framework Indicators

Table 8 shows the framework topics and respective indicators identified in the selected benchmarked schemes. 4 framework issues and 18 related indicators were found among the schemes. The only indicator meaningfully considered³² in the schemes was the existence of a “Management Plan”.

Table 8 Framework indicators identified in the selected schemes

Framework topics	#	Framework indicators
Compliance with laws	1	Compliance with the applicable, laws, international conventions and obligatory codes of practice
	2	Avoidance of illegal activities
Governance	3	Continual improvement
	4	Product or Benefits Diversification
Planning and monitoring	5	Consider other functions of forests than productive ones
	6	Risk assessment/management
	7	Social and Environment Impact assessment
	8	Avoid and mitigate negative impacts and promote positive ones
	9	Management plan
	10	Apply precautionary approach
	11	Identify and Analyse potential emergencies
	12	Planning and management at the landscape level
	13	Connectivity, fragmentation, forest encroachment
	14	To implement adaptive management
Technology	15	Monitor production and process efficiency; to measure the impacts of production and processing
	16	Technological inputs
	17	Transfer of technology
	18	Environmentally friendly technologies

Source: own compilation

³² An indicator is meaningfully considered when at least half of the schemes benchmarked fully take it into account.

5.2 Complementary Indicators

In Table 9, complementary topics and respective indicators to these included in the draft S2Biom set of indicators that are significantly considered in the benchmarked schemes are stated. In total 20 topics and 39 indicators have been identified. In this analysis those schemes considered relevant in the agriculture and bioenergy sectors (RTRS, RSPO and Bonsucro) are included only once. Seven indicators are meaningfully included in these schemes, as follows:

- Land Use Change
- Harvest products and services from the Management Unit at or below a level which can be permanently sustained
- Maintain or restore of areas of water influence
- Monitor periodically key biotic and abiotic factors that might affect health and vitality of ecosystems
- Measures for soil conservation
- Existence of conflict management mechanisms
- Training and requalification of the workforce

Table 9 *Other concepts identified in the benchmarked schemes*

S ₂ Biom related Theme (T) or Criterion (C)	#	Topic	#	Indicators
T1: Environment	1	Waste	1	Waste management and reduction, recycle and re-use of waste
			2	Waste generation per ton of product
	2	Best environmental practices	3	“Responsible” management of wastewater
			4	No use of burning
			5	Responsible management infrastructural development, transport activities and silviculture
	3	Land Use and Land Use Change	6	Assure the permanence of vegetation (regenerate vegetation cover)
			7	Rehabilitate degraded ecosystems
			8	Land Use Change
	4	Sustainable harvesting of forest products and non-wood forest products	9	Harvest products and services from the Management Unit at or below a level which can be permanently sustained
C1: Resource efficiency	5	Resource use	10	Efficiency of systems of production and transformation
			11	Intensity of fossil fuel use
C2: Climate change	6	Best Practices for Resource Efficiency	12	Energy saving practices
			7	Best Environmental Practices for Climate Change mitigation
	14	Practices to increase carbon dioxide sequestration		
8	Climate change	15	Maintenance of forest contribution to global carbon cycles	
C3: Biodiversity	9		16	Practices to diminish spread of invasive introduced species and new pests or diseases

S ₂ Biom related Theme (T) or Criterion (C)	#	Topic	#	Indicators
		Best Environmental Practices for Biodiversity conservation	17	"Responsible" application of agrochemicals (in the case of forestry minimize or eliminate) and biological control agents
			18	Avoid harvesting of threatened or endangered plant species
	10	Other indicators for biodiversity conservation	19	Maintain or restore of areas of water influence
			20	Monitor periodically key biotic and abiotic factors that might affect health and vitality of ecosystems
C4:Soils	11	Best Environmental Practices for soils	21	Avoid planting in certain areas to protect soils
	12	Other considerations for soils conservation	22	Soil surface mechanically tilled per year (% of cultivated area)
			23	Measures for soil conservation
			24	pH (Percentage fields with samples showing analyses within acceptable limits for pH)
C5: Water	13	Best environmental practices	25	Avoid natural water contamination
T2: Social	14	Social wellbeing	26	Promote gender equality
T2: Social	15	Social wellbeing	27	Availability of a mutually agreed and documented system for dealing with complaints and grievances, which is implemented and accepted by affected parties
			28	Use local processing, local services, and local value adding.
			29	Benefit sharing mechanism
			30	Support to vulnerable people
T2: Social	16	Rights of indigenous peoples & local communities	31	Rights of indigenous peoples & local communities -defined in the United Nations Declaration on the Rights of Indigenous Peoples (2007) and ILO Convention 169 (1989).
			32	Existence of conflict management mechanisms

S ₂ Biom related Theme (T) or Criterion (C)	#	Topic	#	Indicators
T2: Social	17	Traditional knowledge	33	Traditional knowledge
C7: Participation and transparency	18	Documented system for participatory processes	34	Negotiations concerning compensation for loss of legal, customary or user rights are dealt with through a documented system that enables indigenous peoples, local communities and other stakeholders to express their views through their own representative institutions as free, prior and informed consent and negotiated agreements
C9: Employment and labour conditions	19	Employment and labour conditions	35	Fair pricing and transparent contracts
		Training of workers	36	Training and requalification of the workforce
T3: Economic	20	Economic	37	Value of products (includes value and volume of production and/or value added per ton)
			38	Means for research
			39	Incentives for investments

Source: own compilation

5.3 Other requirements

The screening of the benchmarked schemes also resulted in a list of indicators that, even if not meaningfully reflected in the schemes analysed, might be of interest for different purposes within the S2Biom sustainability approach:

- Commitment to a code of ethical conduct
- Due-diligence
- Food sovereignty
- Fair access to means of production
- Internal Investment (*assumed that internal investment is a must to comply with the commitment to long-term economic viability)
- Net cash flow
- Marketing of forest products
- Material consumption practices
- Renewable and recycled materials consumption
- (Reduction) of intensity of material use
- Conversion of abandoned agricultural and treeless land into forest
- Promote the use of fallow areas
- Minimum separation of production areas from natural terrestrial ecosystems
- Fallen dead wood, hollow trees, old groves and special rare tree species shall be left in quantities and distribution necessary
- Process of residue removal minimizes harm to ecosystems.
- Use of locally adapted varieties and breeds

Complementary to the systematized issues, some additional requirements were found within the non-benchmarked schemes, as follows:

There are some considerations in EU Member State regulations for solid bioenergy (Pelkmans et al. 2012) that could be of interest for the S2Biom sustainability approach, such as:

- In Belgium, according to the PelletNorm, it is necessary that wood pellets are made from material produced under **Sustainable Forest Management** (for instance, FSC, PEFC or equivalent).
- In Belgium-Flanders, certain biomass types are excluded if they can be used by the **wood processing industry**. When biomass from waste can be valorised by recycling into materials, fodder, etc., it is not eligible as well (Iriarte, Fritsche, Pelkmans 2014).
- The Feed-in Tariff regulation in Hungary states that for **waste** a declaration is needed that it cannot be used from other purposes than fuel. For other biomass the seller has to prove that the biomass cannot be used for food consumption.
- In Poland, there is a draft Decree for large installations (>5MW_{el}) where **round wood** is excluded from green certificates; in terms of wood biomass only forestry residues are allowed, and a minimum (increasing) share of agricultural biomass is required.
- In many countries, there are measures in place to promote the use of **local** biomass for energy.

These requirements recall the approach towards the “cascading use of materials” already integrated in the EU Forest Strategy (EU 2013) for wood, in the waste sector by means of the EU Waste Directive (EU 2008b) or indicated in the German Biorefinery Roadmap (BMELV 2012) and under discussion in NTA8081 (see Section 3). The EU Waste Directive states that options that deliver the best overall environmental outcome should be encouraged so that adaptations for specific waste streams might be needed. This concept and its applicability are still under discussion in the scientific and policy arenas³³.

Ultimately, beyond general considerations with respect to forest bioenergy or solid bioenergy, several countries have developed guidelines for other specific issues such as:

- Harvesting of **forest residues**: Finland, France, Germany, several states in Canada and several states in the US have in place guidelines with the general requirement of maintaining 1/3 of the forest residues on the ground in order to protect biodiversity and soils (Fritsche et al. 2014).

³³ See i.e. <https://biomassekaskaden.de/>

- **Ash recycling:** Sweden has guidelines with recommendations on amount and quality of ashes to be recycled when forest residues are harvested (Swedish Forest Agency 2008).
- **Wastewood for combustion:** Finland makes efforts to determine the chemical composition of recycled wood that can be combusted (Alakangas 2014). Halogenated organic compounds or heavy metals should be at levels lower than those in typical virgin material or higher than typical values of the country of origin.

These considerations are of high interest with regard to particular biomass value chains in the bioenergy sector (see Section 6).

Complementing these considerations there are other requirements included in the SFI (2015) scheme that might be of interest:

- Community Involvement and Landowner Outreach (Objective 12). To broaden the practice of sustainable forestry through public outreach, education, and involvement, and to support the efforts of SFI Implementation Committees.
- Public Land Management Responsibilities (Objective 13). To participate and implement sustainable forest management on public lands by means of “Program Participants with forest management responsibilities on public lands shall participate in the development of public land planning and management processes”.

Other initiatives such as the draft NTA 8081 (NEN 2014) proposes additional issues to be considered:

- **Competition** with food and local applications of biomass (6.3)
- **Local prices** (6.3.1)
- **Raw materials-efficient use of biomass (cascading)** (6.3.2)
- **'ILUC low risk'** (6.3.3)
- **Use of residual flows** (6.5.4.2) including prevention of unnecessary losses and limitation of unnecessary withdrawal of residual flows from other local functions;

There are other approaches that in addition to determining boundaries (they differentiate what is sustainable and what it is not) apply a “**performance based approach**”. This view has been applied in the double counting for certain feedstocks within the RED and in other regulatory structures such as the US

Renewable Fuel Standard (RFS2)³⁴ and the California Low Carbon Fuel Standard. The RED stipulates that biofuels made from wastes, residues, non-food cellulosic material and lignocellulosic material can be double-counted towards the renewable energy target for transport³⁵. The RFS2 requires that each category of renewable fuel emit fewer GHG emissions than the petroleum fuel it replaces and sets specific GHG threshold for each renewable fuel type. Also, the RFS2 sets restrictions on the type of feedstock and the types of land that can be used to grow and harvest the feedstock (Goovaerts et al. 2013). The biofuels categories are defined based on the nature of feedstock/technology, the production process used, and minimum GHG reduction thresholds obtained. The definition (requirements) of renewable biomass limits the types of biomass as well as the type of land from which biomass may be harvested to produce compliant renewable fuels.

In the agriculture sector, it is worth noting that Organic production in the EU (see Annex for details) also makes specific requirements for soils and the products that can be used for pest, disease and weed management.

With respect to the EU **bioeconomy** action plan (EC 2012a) and respective working document (EC 2012b), some requirements are made with respect to sustainability such as:

- Maintain (or create) diverse land structures for farming
- Within the social impacts, the pre-requisite for job creation is that skilled entrepreneurs and project managers can develop and implement business models creating new value chains and value-added bio-based products that are successful in the global marketplace.

Among the targets³⁶ considered in the EU Biodiversity Strategy with relevance for the purpose of this work (and not extensively discussed in previous sections), we should highlight:

- **Restoration**, by 2020, of at least 15 % of degraded ecosystems.
- Increase the contribution of agriculture (by means of the CAP) and forestry to maintaining and enhancing biodiversity (by means of **Forest Management Plans**).

³⁴ <http://www.epa.gov/oms/fuels/renewablefuels/index.htm>

³⁵ See discussion on the impact of this mechanism in Pelkmans et al. 2014b.

³⁶ <http://biodiversity.europa.eu/policy/biodiversity-strategy-plan>

- By 2020, **Invasive Alien Species** (IAS) and their pathways are identified and prioritized, priority species are controlled or eradicated, and pathways are managed to prevent the introduction and establishment of new IAS.

The Resource Efficiency Scoreboard (EC 2014b) proposed as an indicator related to “biodiversity” the **Index of common farmland bird species**.

Other ways to integrate the sustainability of feedstock production are provided by the Brazilian **Environmental zoning** that aims to control by environmental zoning the areas of expansion of biofuels, mainly sugarcane (CENBIO 2013). In this zoning, economic, social and environmental variables were taken into account to assess regional features, potential, and vulnerabilities. Through these GIS-based assessments, overlapping the different maps and information, several categories can be determined, ranging from “inappropriate” to “suitable” areas.

The state of São Paulo has conducted a similar zoning, considering various variables: soil and climate potentials, surface water availability, underground water vulnerability, restrictions to mechanized harvesting, biodiversity protection areas, biodiversity connectivity, biodiversity protection importance, and integral protection units (CENBIO 2013). The resulting map has been the basis for defining regulations that determine parameters and guidelines for sugarcane facilities.

At the federal level, the Brazilian Government launched two national agro-ecological zoning initiatives for sugarcane in 2009 (EMBRAPA 2009), and for palm oil in 2010 (EMBRAPA 2010). The principles guiding the sugarcane agro-ecological zoning were (CENBIO 2013):

- Exclusion of areas with native vegetation. Removal of native vegetation for the expansion of sugarcane cultivation is forbidden,
- Exclusion of some regions for cultivation (e.g. Amazon),
- Identification of areas with low needs for irrigation,
- Identification of low-slope areas (less than 12 %), to allow mechanical harvesting,
- Prioritization of degraded areas or pasture, identifying land currently underutilised or occupied by livestock or degraded pastures as suitable for sugarcane production, and
- Respect for food security guiding the expansion of sugarcane production in order to avoid any sort of risk to food production or to food security.

States such as Mato Grosso do Sul have launched their own zoning, including also the zoning for eucalyptus plantations for pulp and charcoal.

The national biofuels policy and strategy of Mozambique (Resolution 22/2009) considers as strategic pillars (Schut, Slingerland, Locke 2010):

- Limitations on land allocation to biofuel production on the basis of suitable agro-climatic regions through land zoning,
- Approval of selected feedstocks, namely sugarcane and sweet sorghum for ethanol, and coconut and Jatropha for biodiesel,
- The use of sustainability criteria to select investment projects and allocate land titles, and
- The creation of a domestic market for biofuels via blending mandates and increased exports.

6 Conclusions and Recommendations

The benchmark and gap analysis of the selected schemes in the agriculture, forest, and bioenergy sectors against the S2Biom draft sustainability C&I proposal (conceived as an umbrella set of mid-point indicators) has shown that the selected schemes (including voluntary certification schemes and regulations) meaningfully cover the following criteria: biodiversity, soil, water, secure land tenure, and to some extent employment and labour conditions. These schemes also address climate change, particularly with respect to GHG emissions savings along the value chains. Nevertheless, in the forest sector, considerations with respect to climate change are formulated as the Maintenance of forest contribution to global carbon cycles.

In the social theme, Participatory management and transparency are also considered in the schemes. Less frequently present were indicators covering resource efficiency or health risks. Requirements related to air, food security, and production costs were rarely found.

The same general patterns were present when closely looking at the selected voluntary certification schemes.

Identifying consistent sectoral patterns is challenging given that the schemes and regulations selected in each sector serve specific purposes and address specific, sectoral concerns, thus limiting the possibility for comparison. Nonetheless, the research carried out has determined that in addition to environmental considerations, social criteria are also relevant, whilst the production costs (which is the selected indicator in the economic theme in the draft S2Biom proposal) seem to be beyond the purposes of the schemes.

Additional requirements of the benchmarked schemes have been identified and classified as either framework indicators or complementary concepts that provide valuable information to consolidate the approach to sustainability to be developed in task 5.4. The framework indicators have emphasized the importance of some “accompanying” and cross-cutting requirements beyond the draft S2Biom indicators. The framework indicators were grouped around four topics (“Compliance with laws”, “Governance”, “Planning and Monitoring” and “Technology”). Among the 18 indicators found, only the “Existence of Management Plan” was deemed relevant among the benchmarked schemes.

The complementary concepts were grouped around 20 topics and 39 indicators. There were seven indicators meaningfully reflected in the benchmarked schemes: “Land Use Change”, “Harvest products and services from the

Management Unit at or below a level which can be permanently sustained”, “Maintain or restore of areas of water influence”, “Monitor periodically key biotic and abiotic factors that might affect health and vitality of ecosystems”, “Measures for soil conservation”, “Existence of conflict management mechanisms”, and “Training and requalification of the workforce”.

In addition to these complementary indicators, other requirements sparsely found were also listed. The requirements encountered in non-benchmarked schemes were also discussed. These requirements refer to a broad range of provisions for specific feedstocks or value-chains such as “cascading use of wood”.

All of these insights will be considered and integrated in the elaboration of the sustainability approach for specific feedstocks, value-chains, or different scopes to be discussed in other tasks of the project, including the tool to be elaborated in WP4. In view of this analysis, we have a solid basis to consider in further work on sustainability within the project:

- Consider the insights found here in the policy recommendations to progress on the development of **sustainable bioeconomy strategies** at country (or regional) levels to be elaborated in Task 5.3.
- Take into account the different angles, goals, and specific requirements when elaborating the **S2Biom sustainability approach**, especially when developing the so-called “implementable indicators”.
- **Specific** recommendations to refine the S2Biom sustainability set of C&I:
 - Further specify the indicator "**Agrobiodiverse cultivation**" (crop rotation; diversity in the landscape; avoidance of alien species) and amount of chemicals (pesticides/herbicides); release of GMO” to avoid any confusion as to its scope.
 - Given the complexity of some indicators, (e.g. in considering the extent to which **VGGT** are met), this exercise will help more appropriately demarcate the indicator set, especially when implementable indicators are drawn.
 - Regarding **risks to public health**, a definition for this indicator might be “Measures taken to safeguard public health, e.g. regulation of noise level and accidents”.
 - In respect to **food security**, this indicator might be reworded as measures to avoid risks for negative impacts on price and supply of national food basket and fuelwood.

References

- Alakangas E 2014: Classification of wastewood for combustion based on ISO 17225-1 standard DEMOWOOD Conference; 6 May; Munich VTT Technical Research Centre of Finland
- BMELV (Federal Ministry of Food, Agriculture and Consumer Protection - Germany) 2012: Biorefineries Roadmap; Berlin http://www.iea-bioenergy.task42-biorefineries.com/upload_mm/b/7/5/ae2c4917-1917-4a6e-94ee-ad05654a7970_Borefinery%20Roadmap%20Germany%20May%202012_01.pdf
- Bonsucro (Better Sugarcane Initiative Ltd) 2014: Bonsucro Production Standard including Bonsucro EU Production Standard Version 4.0. <http://bonsucro.com/site/wp-content/uploads/2013/02/Bonsucro-Production-Standard-v4.pdf>
- CENBIO (Centro Nacional de Referência em Biomassa) 2013: Possibilities of sustainable woody bioenergy trade and impacts on developing countries. Country Case Study Brazil; prepared for GIZ under subcontract with IINAS; Coelho S, Escobar J; Sao Paulo http://www.iinas.org/tl_files/iinas/downloads/CENBIO_2013_Brazil-Case-Study_GIZ.pdf
- CNE (Comisión Nacional de Energía - Spain) 2012: Análisis comparativo de los Sistemas Nacionales de Sostenibilidad de los Biocarburantes y Biolíquidos en la UE; Madrid <http://www.cne.es/cne/doc/publicaciones/ESTUDIO%20COMPARATIVO%20ESQUEMAS%20DE%20SOSTENIBILIDAD.pdf>
- CFS (Committee on World Food Security) 2012: Voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security; Rome <http://www.fao.org/cfs/cfs-home/downloads/en/>
- EC (European Commission) 2011: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions; Roadmap to a Resource Efficient Europe; Brussels; COM(2011) 571 final; Brussels http://ec.europa.eu/environment/resource_efficiency/pdf/com2011_571.pdf
- EC (European Commission) 2012: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Innovating for Sustainable Growth: A Bioeconomy for Europe; COM(2012) 60 final; February 13; Brussels http://ec.europa.eu/research/bioeconomy/pdf/official-strategy_en.pdf

- EC (European Commission) 2012b: Commission Staff Working Document. Accompanying the document Communication on Innovating for Sustainable Growth: A Bioeconomy for Europe http://ec.europa.eu/dgs/home-affairs/e-library/documents/basic-documents/docs/an_open_and_secure_europe_-_making_it_happen_sw_d_en.pdf
- EC (European Commission) 2012c: The iGrowGreen assessment framework http://ec.europa.eu/economy_finance/indicators/economic_reforms/Quantitative/byIndicatorList/index.cfm?appName=igg&appSid=5 (access Dec 30, 2014)
- EC (European Commission) 2013: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions; A new EU Forest Strategy: for forests and the forest-based sector; SWD(2013) 342 final and SWD(2013) 343 final; COM(2013) 659 final; Brussels <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0659>
- EC (European Commission) 2014a: State of play on the sustainability of solid and gaseous biomass used for electricity; SWD(2014) 259 final; July 28; Brussels http://ec.europa.eu/energy/renewables/bioenergy/doc/2014_biomass_state_of_play.pdf
- EC (European Commission) 2014b: Resource Efficiency Scoreboard 2014 Highlights; Brussels http://ec.europa.eu/environment/resource_efficiency/documents/re_scoreboard.pdf
- EMBRAPA (Brazilian Agricultural Research Corporation) 2009: Agro-ecological Sugarcane Zoning http://www.cnps.embrapa.br/zoneamento_cana_de_acucar
- EMBRAPA (Brazilian Agricultural Research Corporation) 2010: Agro-ecological Palm Oil Zoning http://www.cnps.embrapa.br/zoneamento_dende
- EP (European Parliament) 2012: Our life insurance, our natural capital: an EU biodiversity strategy to 2020; 2011/2307(INI); Brussels http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/EP_resolution_april2012.pdf
- Eppler U, Iriarte L, Fritsche U R 2013: Sustainable Land Use Indicators - A Compilation for WP3; GLOBALANDS Working Paper AP 3.2; Berlin, Madrid, Darmstadt
- EU (European Union) 2007: Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:189:0001:0023:EN:PDF>

- EU (European Union) 2008a: Commission Regulation (EC) No 889/2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control
<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008R0889&from=EN>
- EU (European Union) 2008b: Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives
<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0098&from=EN>
- EU (European Union) 2009a: Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC; Official Journal of the EU, June 5, 2009 L 140, pp. 16-62
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF>
- EU (European Union) 2009b: Directive 2009/30/EC of the European Parliament and of the Council amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC (23 April 2009); Brussels
<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0030&from=EN>
- EU (European Union) 2010: 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; Brussels
<http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:295:0023:0034:EN:PDF>
- EU (European Union) 2012: Our life insurance, our natural capital: an EU biodiversity strategy to 2020; European Parliament resolution of 20 April 2012 on our life insurance, our natural capital: an EU biodiversity strategy to 2020 (2011/2307(INI))
http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/EP_resolution_april2012.pdf
- EU (European Union) 2013a: Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:347:0487:0548:en:PDF>

- EU (European Union) 2013b: Regulation No 1306/2013 of the European Parliament and of the Council of 17 December 2013 on the financing, management and monitoring of the common agricultural policy and repealing Council Regulations (EEC) No 352/78, (EC) No 165/94, (EC) No 2799/98, (EC) No 814/2000, (EC) No 1290/2005 and (EC) No 485/2008
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:347:0549:0607:EN:PDF>
- EU (European Union) 2013c: Regulation 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
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:347:0608:0670:EN:PDF>
- EU (European Union) 2014a: Commission Delegated Regulation No 639/2014 of 11 March 2014 supplementing Regulation (EU) No 1307/2013 of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and amending Annex X to that Regulation.
<http://faolex.fao.org/docs/pdf/eur134757.pdf>
- EU (European Union) 2014b: Commission Implementing Regulation No 641/2014 of 16 June 2014 laying down rules for the application of Regulation (EU) No 1307/2013 of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy.
<http://eurlex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:32014R0641&from=es>
- FAO (Food and Agricultural Organization of the United Nations) 2000: Development of National-level Criteria and Indicators for the sustainable management of dry forests of Asia: Background papers; Bhopal
<http://www.fao.org/docrep/003/x6895e/x6895e02.htm>
- FAO (Food and Agricultural Organization of the United Nations) 2008: International processes on criteria and indicators for sustainable forest management; Rome: FAO
<http://www.fao.org/docrep/004/AC135E/ac135e00.htm#Contents>
- FAO (Food and Agriculture Organization of the United Nations) 2013: Sustainability Assessment of Food and Agriculture systems (SAFA) Indicators; Rome
http://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/SAFA_Indicators_final_19122013.pdf

- FAO (Food and Agriculture Organization of the United Nations) 2014: Bioenergy and Food Security (BEFS) Approach; Rome <http://www.fao.org/energy/befs/en/> (Accessed 26 December 2014)
- Franke B et al 2013: Global Assessment Guidelines for Sustainable Liquid Biofuels Production in Developing Countries; GEF Targeted Research Project executed by UNEP, FAO, UNIDO; Heidelberg, Utrecht, Darmstadt <http://www.unep.org/bioenergy/Portals/48107/publications/Global%20Assessment%20and%20Guidelines%20for%20Biofuels.pdf>
- Fritsche et al. 2012: Sustainable Bioenergy: Key Criteria and Indicators Final D 4.1 of Biomass Futures project; Darmstadt http://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/biomass_futures_sustainable_bioenergy_criteria_and_indicators_en.pdf
- Fritsche U R et al. 2014: Extending the EU Renewable Energy Directive sustainability criteria to solid bioenergy from forests; in: Natural Resources Forum vol. 38, no. 2, pp. 129-140
- Fritsche U R, Iriarte L 2014: Sustainability Criteria and Indicators for the Bio-Based Economy in Europe: State of Discussion and Way Forward; in: Energies vol. 7, no. 11, pp. 6825-6836; doi:10.3390/en7116825 <http://www.mdpi.com/1996-1073/7/11/6825>
- FSC (Forest Stewardship Council) 2014: FSC Principles and Criteria for Forest Stewardship; FSC-STD-01-001 V5-1 EN. <https://ic.fsc.org/preview.principles-and-criteria-for-forest-stewardship-v5-1-fsc-std-01-001-web.a-3859.pdf>
- GBEP (Global Bioenergy Partnership) 2011: Global Bioenergy Partnership Sustainability Indicators for Bioenergy; First Edition; Rome. http://www.globalbioenergy.org/fileadmin/user_upload/gbep/docs/Indicators/The_GBEP_Sustainability_Indicators_for_Bioenergy_FINAL.pdf
- GGL (Green Gold Label) 2013a: GGLS2 - Agricultural Source Criteria. Agricultural Source Criteria version 2013.1 1/3; Green Gold Label Program; Version 2013.1 <http://www.greengoldcertified.org/data/docs/ggls2%20-%20agricultural%20source%20criteria%20v.2013.1.pdf>
- GGL (Green Gold Label) 2013b: GGLS5 - Forest Management Criteria; Forest Management Criteria version 2013.1 1/6; Green Gold Label Program; Version 2013.1 <http://www.greengoldcertified.org/data/docs/ggls5%20-%20forest%20management%20criteria%20v.2013.1.pdf>
- Goovaerts L et al. 2013: Task 1: Examining Sustainability Certification of Bioenergy; Strategic Intertask Study (Task 40/43/38): Monitoring Sustainability Certification of Bioenergy; VITO et al.; Mol etc. <http://www.bioenergytrade.org/downloads/iea-sust-cert-task-1-final2013.pdf>

- Green Growth Knowledge Platform (2013): Moving towards a Common Approach on Green Growth Indicators; Paris etc.
<http://www.greengrowthknowledge.org/sites/default/files/downloads/resource/GGKP%20Moving%20towards%20a%20Common%20Approach%20on%20Green%20Growth%20Indicators.pdf>
- Greenery 2011: Greenery Brazilian Bioethanol verification programme: Greenery bioethanol sustainability criteria for Brazilian sugarcane STD DOC – 002 v.5
http://www.greenery.com/downloads/Standard_Brazilian_sugarcane.pdf
- IFOAM (International Federation of Organic Agriculture Movements) undated: Principles of Organic Agriculture; Boon
http://www.ifoam.bio/sites/default/files/ifoam_poa.pdf
- ILO (International Labour Organization) 1998: Declaration on Fundamental Principles and Rights at Work; G eneve
http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/publication/wcms_095898.pdf
- Iriarte L, Fritsche U R, Pelkmans L 2014: Impact of promotion mechanisms for advanced and low-iLUC biofuels on markets. Wood Pellets from the US to the EU; IEA Bioenergy Task 40: Sustainable International Bioenergy Trade; Madrid, Darmstadt, Mol <http://bioenergytrade.org/downloads/t40-low-iluc-pellet-august-2014.pdf>
- ISCC (International Sustainability and Carbon Certification) 2011: System Basics for the certification of sustainable biomass and bioenergy; ISCC 11-03-15. V 2.3-EU
http://www.iscc-system.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/content/documents/ISCC-Zertifizierungs-Prozess/Zertifizierung/Systemdokumente/ISCC_EU/ISCC_EU_201_EN.pdf&t=1424884428&hash=c9f2951481bd8c225f5360ca43d01c736f14aa56
- ISCC (International Sustainability and Carbon Certification) 2012: ISCC PLUS 201 System Basics System Basics ISCC PLUS Standard for the certification of sustainable biomass and its processing steps; ISCC PLUS 201. V 2.0
http://www.iscc-system.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/content/documents/ISCC-Zertifizierungs-Prozess/Zertifizierung/Systemdokumente/ISCC_PLUS/ISCC_PLUS_201_EN.pdf&t=1424884355&hash=cdf9dc05479141590a8a585cca3b4178bb467d03
- ISCC (International Sustainability and Carbon Certification) 2015: ISCC 202 Sustainability Requirements for the Production of Biomass; ISCC EU version 2.4; 01 January 2015

- http://www.iscc-system.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/content/documents/ISCC-Zertifizierungs-Prozess/Zertifizierung/Systemdokumente/ISCC_EU/ISCC_EU_202_Sustainability_Requirements_for_the_Production_of_Biomass_2.4_EN.pdf&t=1424898192&hash=45ab7a1461060f9b5b236609fea0c5c1bb821596
- NEN (Nederlands Normalisatie-instituut) 2014: Draft NTA 8080-1 (en) Sustainably produced biomass for bioenergy and biobased products — Part 1: Sustainability requirements; Delft <http://www.nen.nl/NEN-Shop/Vakgebieden/Energie-Distributie/Nieuwsberichten-Energie/NTA-8080-for-comments.htm>
- PEFC (Programme for the Endorsement of Forest Certification) 2012: Sustainable Forest Management – Requirements. PEFC ST 1003:2010. http://www.pefc.org/images/documents/PEFC_ST_1003_2010_SFM_Requirements_2010_11_26.pdf
- Pelkmans L et al. 2012: Benchmarking biomass sustainability criteria for energy purposes; Contract ENER/C1/495-2009/SI2.572581; Mol etc. http://ec.europa.eu/energy/renewables/studies/doc/2014_05_biobench_report.pdf
- Pelkmans L et al. 2014a: Guidelines and indicators for the evaluation of sustainable resource efficient biomass value chains Deliverable 2.6 of the Biomass Policies project; Mol <http://www.biomasspolicies.eu/wp-content/uploads/2014/12/Guidelines-and-indicators-for-the-evaluation-of-sustainable-resource-efficient-biomass-value-chains.pdf>
- Pelkmans L et al. 2014b: Impact of promotion mechanisms for advanced and low-ilUC biofuels on markets. Summary report; IEA Bioenergy Task 40: Sustainable International Bioenergy Trade; Mol etc. <http://www.bioenergytrade.org/downloads/t40-low-iluc-summary-august-2014.pdf>
- RSB (Roundtable on Sustainable Biomaterials) 2010: Indicators of Compliance For the RSB EU RED Principles & Criteria. Version 2.1 <http://rsb.org/pdfs/standards/RSB-EU-RED-Standards/10-12-13%20RSB-IND-11-001-20->
- RSB (Roundtable on Sustainable Biomaterials) 2011: Indicators of Compliance for the RSB Principles & Criteria; Version 2.1. <http://www.rsb.org/pdfs/standards/11-03-08%20RSB%20Indicators%202-1.pdf>
- RSPO (Roundtable on Sustainable Palm Oil) 2013a: Guidance Document on: RSPO-RED Requirements for compliance with the EU Renewable Energy Directive requirements. Version of 4 February 2013 (approved by the RSPO Executive Board on 28th February 2013) <http://www.rspo.org/file/RSPO-RED-requirements-GuidanceDocument-FINAL.pdf>

- RSPO (Roundtable on Sustainable Palm Oil) 2013b: P&C for the Production of Sustainable Palm Oil. Endorsed by the RSPO Executive Board and accepted at the Extraordinary General Assembly by RSPO Members on April 25th 2013 (Including Major Indicators endorsed by RSPO Board of Governors on 15 November 2013) <http://www.rspo.org/resources/key-documents/certification/rspo-principles-and-criteria>
- RTRS (Round Table on Responsible Soy Association) 2011: RTRS EU RED Scheme: System Description Version 2.0 <http://www.responsiblesoy.org/?wpdmdl=1978&ind=0>
- RTRS (Round Table on Responsible Soy Association) 2013a: RTRS EU RED Compliance Requirements for Producers Version 3.1. <http://www.google.es/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCQQFjAA&url=http%3A%2F%2Fwww.responsiblesoy.org%2F%3Fwpdmdl%3D1979%26ind%3D0&ei=oXGhVKSTBlBUez0gZgL&usq=AFQjCN Gtj7nZn9WMxyYU1F4xbywYI95Syw&bvm=bv.82001339,d.d24>
- RTRS (Round Table on Responsible Soy Association) 2013b: RTRS Standard for Responsible Soy Production Version 2.0. <http://www.responsiblesoy.org/documentos/rtrs-standard-for-responsible-soy-production-pdf/>
- SAN (Sustainable Agriculture Network) 2010: Sustainable Agriculture Standard (v. 3) http://www.san.ag/biblioteca/docs/SAN-S-1-1.2_Sustainable_Agriculture_Standard.pdf
- SBP (Sustainable Biomass Partnership) 2014: Biomass Assurance Framework Standard #1: Feedstock Compliance Standard. Version 0.0 <http://www.sustainablebiomasspartnership.org/docs/Standard01.pdf>
- Schut M, Slingerland M, Locke A 2010: Biofuel developments in Mozambique. Update and analysis of policy, potential and reality; in: Energy Policy vol. 38, pp. 5151–5165
- SFI (Sustainable Forestry Initiative) SFI 2015-2019 Standards and Rules; Washington, Ottawa; <http://www.sfiprogram.org/files/pdf/2015-2019-standardsandrules-web-lr-pdf/>
- Stupak I et al. 2011: Criteria and indicators for sustainable forest fuel production and harvesting: A review of current standards for sustainable forest management; in: Biomass and Bioenergy vol. 35, no. 8, pp. 3287-3308
- Swedish Forest Agency, 2008: Recommendations for extraction of harvesting residues and ash recycling. English translation of Rekommendationer vid uttag av avverkningsrester och askåterföring. Swedish Forest Agency Meddelande (Letter) 2:2008. ISSN 1100-0295 <http://www.skogsstyrelsen.se/Global/PUBLIKATIONER/InEnglish/guidelines.pdf>

S2Biom Project Grant Agreement n°608622

Deliverable 5.1:

Benchmark and gap analysis of criteria and indicators (C&I) for legislation, regulations and voluntary schemes at international level and in selected EU Member States

Annex

March 2015



About S2Biom project

The S2Biom project - Delivery of sustainable supply of non-food biomass to support a “resource-efficient” Bioeconomy in Europe - supports the sustainable delivery of non-food biomass feedstock at local, regional and pan European level through developing strategies, and roadmaps that will be informed by a “computerized and easy to use” toolset (and respective databases) with updated harmonized datasets at local, regional, national and pan European level for EU28, Western Balkans, Moldova, Turkey and Ukraine. Further information about the project and the partners involved are available under www.s2biom.eu.

Project coordinator



Scientific coordinator



Project partners



About this document

This report is the annex to the main report of deliverable 5.1 – Benchmark and gap analysis of criteria and indicators (C&I) for legislation, regulations and voluntary schemes at international level and in selected EU Member States

Due date of deliverable:	December 2014
Actual submission date:	March 2015
Start date of project:	2013-01-09
Duration:	36 months

Work package	5
Task	5.1
Lead contractor for this deliverable	IINAS
Editor	n.a.
Authors	Leire Iriarte, Uwe R. Fritsche (IINAS)
Quality reviewer	

Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Version	Date	Author(s)	Reason for modification	Status
0.1	13/02/2015	Leire Iriarte, Uwe R. Fritsche	First version defining request for input from partners	Draft
0.2	30/03/2015	Leire Iriarte, Uwe R. Fritsche	Inputs from partners received and included	Final
1	7/04/2017	Uwe R. Fritsche	Minor corrections	Revised Final

This project entitled S2BIOM (Delivery of sustainable supply of non-food biomass to support a “resource-efficient” Bioeconomy in Europe) is co-funded by the European Union within the 7th Framework Programme. Grant Agreement n°608622.

The sole responsibility of this publication lies with the authors. The European Union is not responsible for any use that may be made of the information contained therein.

Table of contents

About S2Biom project.....	1
About this document	2
List of Tables	4
Methodology overview.....	5
Annex 1. S2BIOM INDICATORS	6
1.1. Forest schemes	6
1.2. Agricultural schemes	38
1.3. Bioenergy schemes	75
Annex 2. FRAMEWORK INDICATORS	146
Annex 3. COMPLEMENTARY INDICATORS	200
3.1. Forest schemes	200
3.2 Agricultural schemes.....	236
3.3. Bioenergy schemes	275
Annex 4. COMPLEMENTARY INDICATORS	332
4.1. Forest schemes	332
4.2. Agricultural schemes.....	339
4.3. Bioenergy schemes	345
Annex 5. Non- benchmarked issues.....	349

List of Tables

Table 1	Benchmark and gap analysis of the selected Forest schemes against the (draft) S2Biom indicators.....	6
Table 2	Benchmark and gap analysis of the selected agricultural schemes against the (draft) S2Biom indicators	38
Table 3	Benchmark and gap analysis of the selected Bioenergy schemes against the (draft) S2Biom indicators	75
Table 4	Benchmark and Gap Analysis of the selected Forest Schemes against the identified Framework indicators.....	146
Table 5	Benchmark and gap analysis of the selected agricultural schemes against the identified Framework indicators	164
Table 6	Benchmark and gap analysis of the selected Bioenergy schemes against the identified Framework indicators	178
Table 7	Benchmark and gap analysis of the selected Forest schemes against the identified Complementary indicators (meaningfully reflected in the analysed schemes)	200
Table 8	Benchmark and gap analysis of the selected agricultural schemes against the identified Complementary indicators (meaningfully reflected in the analysed schemes).....	236
Table 9	Benchmark and gap analysis of the selected Bioenergy schemes against the identified Complementary indicators (meaningfully reflected in the analysed schemes).....	275
Table 10	Benchmark and gap analysis of the selected Forest schemes against the identified Complementary indicators (not meaningfully reflected in the analysed schemes)	332
Table 11	Benchmark and gap analysis of the selected agricultural schemes against the identified Complementary indicators (not meaningfully reflected in the analysed schemes).....	339
Table 12	Benchmark and gap analysis of the selected Bioenergy schemes against the identified Complementary indicators (not meaningfully reflected in the analysed schemes).....	345

Methodology overview

This annex provides the exact provisions for each indicator or issue of the schemes selected for the benchmark and gap analysis described in the main report. They are classified by type of provision:

- S2Biom indicators,
- Framework indicators (FI)
- Complementary indicators (CI)

Within each requirement, a sectoral (forest, agriculture and bioenergy) analysis has been made.

Two categories were used to describe the extent to which each indicator performs against those provisions:

- Indicator fully considered (symbol ✓), this means that the main issues of the indicators against which is benchmarked (S2Biom indicators, framework issues, best practices or implementable indicators) are captured by the schemes (units have not been considered).
- Indicator partially considered (symbol ~). In this case, the main message is only partially covered by the concept considered in the scheme (S2Biom indicators, framework issues, best practices or implementable indicators). Generally, just part of the indicator's message is taken into account or the provision of the scheme is quite ambiguous.

The category of each scheme is showed after its name, following the information related to each indicator. Indicators for which information has not been found in the analysed schemes are not mentioned in this Annex.

Further considerations and the full list of references are provided in the main report.

Annex 1. S2BIOM INDICATORS

1.1. Forest schemes

In Table 1 the benchmark and gap analysis of the selected Forest schemes against the (draft) S2Biom indicators is shown.

Table 1 *Benchmark and Gap analysis of the selected Forest schemes against the (draft) S2Biom Indicators*

Theme	Criteria	#	Indicator	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal	
ENVIRONMENTAL	1. Resource efficiency	1.1	Land use efficiency															
		1.2	Secondary resource efficiency															
		1.3	Energy efficiency															
		1.4	Functionality (output service quality)															
	2. Climate change	2.1	Life cycle GHG emissions (CO ₂ eq) including direct LUC															

Theme	Criteria	#	Indicator	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal	
		2.2	Other GHG emissions															
	3. Biodiversity	3.1	Protected areas and land with significant biodiversity values	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		3.2	Biodiversity conservation and management	✓	✓	✓	✓	✓	✓	✓	✓	✓	~	~	~	~	✓	✓
	4. Soil	4.1	Erosion	✓	✓	✓	✓	✓	✓	✓	✓	✓			~	✓	✓	✓
		4.2	Soil Organic C	✓	✓	✓		✓						✓	~	✓	✓	✓
		4.3	Soil nutrient balance	✓	✓	✓	~	~	~	~		~	✓	✓	~	✓	✓	~
	5. Water	5.1	Water availability and regional water stress	✓	✓	✓		✓			✓	✓	✓	✓	✓		✓	✓
		5.2	Water use efficiency															
		5.3	Water quality	✓	✓							✓	✓	✓	~			✓

Theme	Criteria	#	Indicator	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal	
	6. Air	6.1	SO2 equivalents	~														
		6.2	PM10	~														
SOCIAL	7. Participation and transparency	7.1	Effective participatory process	✓	✓	✓	✓	✓	✓	~	✓	✓	✓	✓	✓	~	~	
		7.2	Information transparency	✓	✓			~				✓						
	8. Secure tenure of land	8.1	Compliance with the VGGT to secure land tenure and ownership	✓	✓		✓		✓		✓	✓	✓	✓		✓	✓	
	9. Employment and labour conditions	9.1	Full direct job equivalents along the full value chain					✓			✓		✓	✓		✓	✓	✓
		9.2	Full direct job equivalents in the biomass consuming region (or country)	✓	✓	✓						✓	✓		✓			
		9.3	Human and labour rights	✓	✓							~			✓			

Theme	Criteria	#	Indicator	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal
		9.4	Occupational safety and health for workers	✓	✓		✓		✓		✓					✓	
	10. Health Risks	10.1	Risks to public health	~	~												
	11. Food Security	11.1	Risks for negative impacts on price and supply of national food basket and fuelwood.							~		~	~		~		
ECONOMIC	12. Production costs	12.1	Levelised life-cycle cost, excluding subsidies (including CAPEX, OPEX)														

3. Biodiversity

3.1. Protected areas and land with significant biodiversity values

FSC (✓)

6.4 The Organization shall protect rare species and threatened species and their habitats in the Management Unit through conservation zones, protection areas, connectivity and/or (where necessary) other direct measures for their survival and viability. These measures shall be proportionate to the scale, intensity and risk of management activities and to the conservation status and ecological requirements of the rare and threatened species.

The Organization shall take into account the geographic range and ecological requirements of rare and threatened species beyond the boundary of the Management Unit, when determining the measures to be taken inside the Management Unit.

6.9 The Organization* shall not convert natural forest* to plantations*, nor natural forests or plantations on sites directly converted from natural forest to non-forest land use, except when the conversion:

- a) Affects a very limited portion of the area of the Management Unit*, and
- b) will produce clear, substantial, additional, secure long-term conservation benefits in the Management Unit, and
- c) does not damage or threaten High Conservation Values*, nor any sites or resources necessary to maintain or enhance those High Conservation Values.

9. High Conservation Values: The Organization shall maintain and/or enhance the High Conservation Values in the Management Unit through applying the precautionary approach.

PEFC (✓)

5.4.2 Forest management planning, inventory and mapping of forest resources shall identify, protect and/or conserve ecologically important forest areas containing significant concentrations of:

- a) protected, rare, sensitive or representative forest ecosystems such as riparian areas and wetland biotopes;
- b) areas containing endemic species and habitats of threatened species, as defined in recognised reference lists;

- c) endangered or protected genetic in situ resources; and taking into account
- d) globally, regionally and nationally significant large landscape areas with natural distribution and abundance of naturally occurring species.

Note: This does not necessarily exclude forest management activities that do not damage biodiversity values of those biotopes.

Tarapoto FMU (✓)

5.2 Area and percentage of forest lands managed for environmental protection.

10.1 Proportion of area of permanent production in areas of environmental protection.

ITTO FMU (✓)

5.7. Extent and percentage of production forest that has been set aside for biodiversity conservation

Tarapoto CL (✓)

4.1 Area, by forest type, in categories of protected areas, in relation to total forest area.

5.2 Area and percentage of forest lands managed for environmental protection.

ITTO CL (✓)

5.1. Protected areas containing forests

5.7. Extent and percentage of production forest that has been set aside for biodiversity conservation

ASI (✓)

3: Maintenance and enhancement of bio-diversity.

3.1 Extent of protected areas

ATO (✓)

III.2.1. Zones of biological protection where no interference is authorized are created in the permanent forest estate.

III.2.2. The size of biological reserves is adapted to suit the object of preservation.

III.2.3. Selection of biological preservation areas should take into account their potential for effective protection.

III.2.4. Special provisions for the protection of sensitive areas, plains, stream banks, steep slopes should be defined in the management plan.

CILSS (✓)

2.2 Extent of Protected Areas

SADC (✓)

2.2 Extent of protected areas

2.3 Conservation areas outside protected areas

Lepaterique CL (✓)

2.2. Area forest under management in relation to:

- Area of forest in protected areas
- Area of forest outside of protected areas.

4.1. Number and area of protected areas with established management plans, working plans and/or applied silviculture.

5.1. Percentage and area of forest types in the various categories of protected areas.

Near East Process (✓)

2.2 Areas of forest reserves and protected areas

2.4 Excisions affecting rare ecosystems by area

5.1 Extent of forests and other wooded lands managed for protection purposes

MCFPE (✓)

4.9 Protected forests. Area of forest and other wooded land protected to conserve biodiversity, landscapes and specific natural elements, according to MCPFE Assessment Guidelines

Montreal Process (✓)

1.1.b Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage.

3.2. Biodiversity conservation and management

FSC (✓)

6. Environmental Values and Impacts: The Organization shall maintain, conserve and/or restore ecosystem services and environmental values of the Management Unit, and shall avoid, repair or mitigate negative environmental impacts.

6.6 The Organization shall effectively maintain the continued existence of naturally occurring native species and genotypes, and prevent losses of biological diversity, especially through habitat management in the Management Unit. The Organization shall demonstrate that effective measures are in place to manage and control hunting, fishing, trapping and collecting.

10.4 The Organization shall not use genetically modified organisms in the Management Unit.

PEFC (✓)

5.4.1 Forest management planning shall aim to maintain, conserve and enhance biodiversity on ecosystem, species and genetic levels and, where appropriate, diversity at landscape level.

5.4.7 Genetically-modified trees shall not be used.

5.4.8 Forest management practices shall, where appropriate, promote a diversity of both horizontal and vertical structures such as uneven-aged stands and the diversity of species such as mixed stands. Where appropriate, the practices shall also aim to maintain and restore landscape diversity.

5.4.10 Tending and harvesting operations shall be conducted in a way that does not cause lasting damage to ecosystems. Wherever possible, practical measures shall be taken to improve or maintain biological diversity.

5.4.13 Standing and fallen dead wood, hollow trees, old groves and special rare tree species shall be left in quantities and distribution necessary to safeguard biological diversity, taking into account the potential effect on the health and stability of forests and on surrounding ecosystems.

Tarapoto FMU (✓)

10.2 Measures to protect, recuperate and sustainable use wild populations of species in danger of extinction.

ITTO FMU (✓)

5.6. Existence and implementation of procedures for the protection and monitoring of biodiversity in production forests by:

(a) retaining undisturbed areas;

(b) protecting rare, threatened and endangered species;

(c) protecting features of special biological interest (e.g., nesting sites, seed trees, niches, keystone species, etc.);

Tarapoto CL (✓)

4.2 Measures for «in situ» conservation of species in danger of extinction.

4.3 Measures for the conservation of genetic resources.

ITTO CL (✓)

5.6. Existence and implementation of procedures for the protection and monitoring of biodiversity in production forests by:

(a) retaining undisturbed areas;

(b) protecting rare, threatened and endangered species;

(c) protecting features of special biological interest (e.g., nesting sites, seed trees, niches, keystone species, etc.); and

(d) assessing recent changes in (a), (b) and (c) above through inventories, monitoring/assessment programs and comparison with control areas.

ASI (✓)

3.2 Number of, threatened, keystone, flagship and endemic species of plants and animals

3.3 List of flora and fauna

3.4 Degree of non-destructive harvest

3.5 Percentage of cover by forest type and/or species

3.6 Existence of mechanisms for the conservation of genetic resources

ATO (✓)

III.2.5. The management plans of forest only provide for single - specie or exotic species plantations when other types of silvicultural action have been considered by forest management experts and abandoned for justified reasons.

III.2.6. If enrichment plantings are carried out in logger-over forests, preference will be given to species that were actually harvested in the forest.

III.2.7. Rare or endangered species are protected.

III.2.8. Non timber forest products in high demand are the objects of conservation and domestication trials.

CILSS (~)

2.5 Number of forest-dependent species

2.6 Number of forest dependent species at risk

2.7 Number of forest dependant species that have disappeared

2.8 Number of species that have reappeared

2.9 Average number of provenances

2.10 Number of forest dependent species with reduced range

2.11 Population levels of key species across their range

2.12 Management of genetic resources

SADC (~)

2.4 Area lost annually of forest ecosystems containing endemic species

2.5 Number of forest-dependent species (and its change over time)

2.6 Number of forest dependent species at risk

2.7 Resources exploitation systems used

2.8 Average number of provenance (and its change over time)

2.9 Number of forest dependent species with reduced range

2.10 Population levels of key species across their range

2.11 Degree of management of genetic resources

Lepaterique CL (~)

5.2. Number of endemic, threatened and/or endangered species.

5.3. Estimates on wildlife species dependent on forest habitats.

5.6. Number of species conserved ex-situ (e.g. in seed banks).

Near East Process (~)

2.5 No. of forest dependent species (fauna, flora)

2.6 Area and number of species at risk in forest areas

2.7 Extent of mixed stands

2.8 Reliance on natural regeneration

2.9 Existence of the number of seed provenance

2.10 No. of forest dependent species with reduced range

2.11 Population levels of key species across their range

MCFPE (✓)

4.1 Tree species composition Area of forest and other wooded land, classified by number of tree species occurring and by forest type

4.2 Regeneration Area of regeneration within even-aged stands and uneven-aged stands, classified by regeneration type

4.3 Naturalness Area of forest and other wooded land, classified by “undisturbed by man”, by “semi-natural” or by “plantations”, each by forest type

4.4 Introduced tree species Area of forest and other wooded land dominated by introduced tree species

4.5 Deadwood Volume of standing deadwood and of lying deadwood on forest and other wooded land classified by forest type

4.6 Genetic resources Area managed for conservation and utilisation of forest tree genetic resources (in situ and ex situ gene conservation) and area managed for seed production

4.7 Landscape pattern Landscape-level spatial pattern of forest cover

4.8 Threatened forest species Number of threatened forest species, classified according to IUCN Red List categories in relation to total number of forest species

2. QUALITATIVE INDICATOR.

B.6. Biodiversity

Montreal Process (✓)

1.2.a Number of native forest associated species

1.2.b Number and status of native forest-associated species at risk, as determined by legislation or scientific assessment

1.2.c Status of on site and off site efforts focused on conservation of species diversity

1.3.a Number and geographic distribution of forest-associated species at risk of losing genetic variation and locally adapted genotypes

1.3.b Population levels of selected representative forest-associated species to describe genetic diversity

1.3.c Status of on site and off site efforts focused on conservation of genetic diversity

4. Soil

4.1. Erosion

FSC (✓)

6.1 The Organization shall assess environmental values in the Management Unit and those values outside the Management Unit potentially affected by management activities. This assessment shall be undertaken with a level of detail, scale and frequency that is proportionate to the scale, intensity and risk of management activities, and is sufficient for the purpose of deciding the necessary conservation measures, and for detecting and monitoring possible negative impacts of those activities.

6.2 Prior to the start of site-disturbing activities, The Organization shall identify and assess the scale, intensity and risk of potential impacts of management activities on the identified environmental values.

6.3 The Organization shall identify and implement effective actions to prevent negative impacts of management activities on the environmental values, and to mitigate and repair those that occur, proportionate to the scale, intensity and risk of these impacts.

9.1 The Organization*, through engagement* with affected stakeholders*, interested stakeholders* and other means and sources, shall assess and record the presence and status of the following High Conservation Values* in the Management Unit*, proportionate to the scale, intensity and risk* of impacts of management activities, and likelihood of the occurrence of the High Conservation Values: (...)

HCV 4 - Critical ecosystem services. Basic ecosystem services* in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes. (...)

10.10 The Organization* shall manage infrastructural development, transport activities and silviculture* so that water resources and soils are protected, and disturbance of and damage to rare* and threatened species*, habitats*, ecosystems* and landscape values* are prevented, mitigated and/or repaired.

PEFC (✓)

5.5.1 Forest management planning shall aim to maintain and enhance protective functions of forests for society, such as protection of infrastructure, protection from soil erosion, protection of water resources and from adverse impacts of water such as floods or avalanches.

5.5.3 Special care shall be given to silvicultural operations on sensitive soils and erosion-prone areas as well as in areas where operations might lead to excessive erosion of soil into watercourses. Inappropriate techniques such as deep soil tillage and use of unsuitable machinery shall be avoided in such areas. Special measures shall be taken to minimise the pressure of animal populations.

5.5.5 Construction of roads, bridges and other infrastructure shall be carried out in a manner that minimises bare soil exposure, avoids the introduction of soil into watercourses and preserves the natural level and function of water courses and river beds. Proper road drainage facilities shall be installed and maintained.

Tarapoto FMU (✓)

9.2 Area and percentage of forest soils affected by significant alterations in physical-chemical properties and erosion.

10.5 Soil conservation measures

ITTO FMU (✓)

6.3. Procedures to protect soil productivity and water retention capacity within production forests.

6.4. Procedures for forest engineering, including:

- (a) drainage requirements;
- (b) conservation of buffer strips along streams and rivers;
- (c) protection of soils from compaction by harvesting machinery; and
- (d) protection of soil from erosion during harvesting operations

6.5. Extent and percentage of areas in production PFE that have been defined as environmentally sensitive (e.g., very steep or erodible) and protected

Tarapoto CL (✓)

5.1 Measures for soil conservation.

ITTO CL (✓)

6.3. Procedures to protect soil productivity and water retention capacity within production forests.

6.4. Procedures for forest engineering, including:

- (a) drainage requirements;
- (b) conservation of buffer strips along streams and rivers;
- (c) protection of soils from compaction by harvesting machinery; and
- (d) protection of soil from erosion during harvesting operations

6.5. Extent and percentage of areas in production PFE that have been defined as environmentally sensitive (e.g., very steep or erodible) and protected

ASI (✓)

4.4 Extent/degree of soil erosion

ATO (✓)

III.3.2. Erosion and other forms of soil degradation are minimised.

Lepaterique CL (~)

4.4. Area and percentage of forest managed for soil and water conservation.

Near East Process (✓)

5.4 Areas managed for soil protection

5.6. Area of eroded hillsides annually rehabilitated through tree/shrub planting

5.7 Efficiency of trees/shrubs planted in stabilizing sand dunes or rehabilitating eroded hill sides

MCFPE (✓)

5.1 Protective forests – soil, water and other ecosystem functions: Area of forest and other wooded land designated to prevent soil erosion, to preserve water resources, or to maintain other forest ecosystem functions, part of MCFPE Class “Protective Functions”

Montreal Process (✓)

4.2.a Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources

4.2.b Area and percent of forest land with significant soil degradation

4.2. Soil Organic C**FSC (✓)**

9.1 The Organization*, through engagement* with affected stakeholders*, interested stakeholders* and other means and sources, shall assess and record the presence and status of the following High Conservation Values* in the Management Unit*, proportionate to the scale, intensity and risk* of impacts of management activities, and likelihood of the occurrence of the High Conservation Values: (...)

HCV 4 - Critical ecosystem services. Basic ecosystem services* in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes. (...)

PEFC (✓)

5.5.1 Forest management planning shall aim to maintain and enhance protective functions of forests for society, such as protection of infrastructure, protection from soil erosion, protection of water resources and from adverse impacts of water such as floods or avalanches.

5.1.9 Forest management practices shall safeguard the quantity and quality of the forest resources in the medium and long term by balancing harvesting and growth rates, and by preferring techniques that minimise direct or indirect damage to forest, soil or water resources.

Tarapoto FMU (✓)

9.2 Area and percentage of forest soils affected by significant alterations in physical-chemical properties and erosion.

10.5 Soil conservation measures

Tarapoto CL (✓)

5.1 Measures for soil conservation.

SADC (✓)

3.3 Changes in soil fertility

Lepaterique CL (~)

4.4. Area and percentage of forest managed for soil and water conservation.

Near East Process (✓)

5.4 Areas managed for soil protection

MCFPE (✓)

2.2 Soil condition. Chemical soil properties (pH, CEC, C/N, organic C, base saturation) on forest and other wooded land related to soil acidity and eutrophication, classified by main soil types

Montreal Process (✓)

4.2.a Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources

4.2.b Area and percent of forest land with significant soil degradation

4.3. Soil nutrient balance**FSC (✓)**

9.1 The Organization*, through engagement* with affected stakeholders*, interested stakeholders* and other means and sources, shall assess and record the presence and status of the following High Conservation Values* in the Management Unit*, proportionate to the scale, intensity and risk* of impacts of management activities, and likelihood of the occurrence of the High Conservation Values: (...)

HCV 4 - Critical ecosystem services. Basic ecosystem services* in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes. (...)

PEFC (✓)

5.5.1 Forest management planning shall aim to maintain and enhance protective functions of forests for society, such as protection of infrastructure, protection from soil erosion, protection of water resources and from adverse impacts of water such as floods or avalanches.

5.1.9 Forest management practices shall safeguard the quantity and quality of the forest resources in the medium and long term by balancing harvesting and growth rates, and by preferring techniques that minimise direct or indirect damage to forest, soil or water resources.

Tarapoto FMU (✓)

9.2 Area and percentage of forest soils affected by significant alterations in physical-chemical properties and erosion.

10.5 Soil conservation measures

ITTO FMU (~)

6.3. Procedures to protect soil productivity and water retention capacity within production forests

Tarapoto CL (~)

5.1 Measures for soil conservation.

ITTO CL (~)

6.3. Procedures to protect soil productivity and water retention capacity within production forests

ATO (~)

III.3.2. Erosion and other forms of soil degradation are minimised.

CILSS (✓)

3.3 Changes in nutrient balance and soil acidity

SADC (✓)

3.3 Changes in soil fertility

Lepaterique CL (~)

4.4. Area and percentage of forest managed for soil and water conservation.

Near East Process (✓)

5.4 Areas managed for soil protection

MCFPE (✓)

2.2 Soil condition. Chemical soil properties (pH, CEC, C/N, organic C, base saturation) on forest and other wooded land related to soil acidity and eutrophication, classified by main soil types

Montreal Process (~)

4.2.a Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources

4.2.b Area and percent of forest land with significant soil degradation

5. Water***5.1. Water availability and regional water stress*****FSC (✓)**

6.7 The Organization shall protect or restore natural water courses, water bodies, riparian zones and their connectivity. The Organization shall avoid negative impacts on water quality and quantity and mitigate and remedy those that occur.

PEFC (✓)

5.5.4 Special care shall be given to forest management practices in forest areas with water protection functions to avoid adverse effects on the quality and quantity of water resources. Inappropriate use of chemicals or other harmful substances or inappropriate silvicultural practices influencing water quality in a harmful way shall be avoided.

Tarapoto FMU (✓)

10.6 Measures for protection of water courses from forest activities

Tarapoto CL (✓)

5.3 Percentage of forest flooded in relation to the historic range of variation, and maintenance of the relationship between the forest and hydrobiological resources.

5.4 Effects of forest conservation on the integrated management of water resources.

ASI (✓)

4.5 Change in level of water table

ATO (✓)

III.3.1. Water system (regime) and quality do not decrease.

CILSS (✓)

5.2 Areas and percentages of forests and other wooded areas managed mainly for the production of water, protection of watersheds, riverine zones and for flood control

SADC (✓)

5.2 Areas and percentages of forests and other wooded areas managed mainly for the Production of water, protection of watersheds, riverine zones and for flood control

Lepaterique CL (✓)

4.4. Area and percentage of forest managed for soil and water conservation.

4.3. Number, area and percentage of watersheds with a management plan.

4.5. Relation between forest cover by watershed and frequency of flooding.

MCFPE (✓)

5.1 Protective forests – soil, water and other ecosystem functions: Area of forest and other wooded land designated to prevent soil erosion, to preserve water resources, or to maintain other forest ecosystem functions, part of MCFPE Class “Protective Functions”

Montreal Process (✓)

4.3.a Proportion of forest management activities that meet best management practices, or other relevant legislation, to protect water related resources

4.3.b Area and percent of water bodies, or stream length, in forest areas with significant change in physical, chemical or biological properties from reference conditions

5.3. Water quality**FSC (✓)**

6.7 The Organization shall protect or restore natural water courses, water bodies, riparian zones and their connectivity. The Organization shall avoid negative impacts on water quality and quantity and mitigate and remedy those that occur.

PEFC (✓)

5.1.1 Forest management planning shall aim to maintain or increase forests and other wooded areas and enhance the quality of the economic, ecological, cultural and social values of forest resources, including soil and water. This shall be done by making full use of related services and tools that support land-use planning and nature conservation.

5.5.3 Special care shall be given to silvicultural operations on sensitive soils and erosion-prone areas as well as in areas where operations might lead to excessive erosion of soil into watercourses. Inappropriate techniques such as deep soil tillage and use of unsuitable machinery shall be avoided in such areas. Special measures shall be taken to minimise the pressure of animal populations.

5.5.4 Special care shall be given to forest management practices in forest areas with water protection functions to avoid adverse effects on the quality and quantity of water resources. Inappropriate use of chemicals or other harmful substances or inappropriate silvicultural practices influencing water quality in a harmful way shall be avoided.

5.5.5 Construction of roads, bridges and other infrastructure shall be carried out in a manner that minimises bare soil exposure, avoids the introduction of soil into watercourses and preserves the natural level and function of water courses and river beds. Proper road drainage facilities shall be installed and maintained.

ASI (✓)

4.6 Change in sediment load

ATO (✓)

III.3.1. Water system (regime) and quality do not decrease.

SADC (✓)

5.3 Change in water yield and quality

Lepaterique CL (~)

4.4. Area and percentage of forest managed for soil and water conservation.

Montreal Process (✓)

4.3.b Area and percent of water bodies, or stream length, in forest areas with significant change in physical, chemical or biological properties from reference conditions

6. Air

6.1. SO₂ equivalents

FSC (~)

9.1 The Organization, through engagement with affected stakeholders, interested stakeholders and other means and sources, shall assess and record the presence and status of the following High Conservation Values in the Management Unit, proportionate to the scale, intensity and risk of impacts of management activities, and likelihood of the occurrence of the High Conservation Values: (...)

HCV 4 - Critical ecosystem services. Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes. (...)

6.2. PM₁₀

FSC (~)

9.1 The Organization*, through engagement* with affected stakeholders*, interested stakeholders* and other means and sources, shall assess and record the presence and status of the following High Conservation Values* in the Management Unit*, proportionate to the scale, intensity and risk* of impacts of management activities, and likelihood of the occurrence of the High Conservation Values: (...)

HCV 4 - Critical ecosystem services. Basic ecosystem services* in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes. (...)

7. Participation and transparency

7.1. Effective participatory process

FSC (✓)

3.3 In the event of delegation of control over management activities, a binding agreement between The Organization and the indigenous peoples shall be concluded through Free, Prior and Informed Consent. The agreement shall define its duration, provisions for renegotiation, renewal, termination, economic conditions and other terms and conditions. The agreement shall make provision for monitoring by indigenous peoples of The Organization's compliance with its terms and conditions.

3.6 The Organization shall uphold the right of indigenous peoples to protect and utilise their traditional knowledge and shall compensate indigenous peoples for the utilization of such knowledge and their intellectual property. A binding agreement as per Criterion 3.3 shall be concluded between The Organization and the indigenous peoples for such utilization through Free, Prior and Informed Consent before utilization takes place and shall be consistent with the protection of intellectual property rights.

4.1 The Organization shall identify the local communities that exist within the Management Unit and those that are affected by management activities. The Organization shall then, through engagement with these local communities, identify their rights of tenure, their rights of access to and use of forest resources and ecosystem services, their customary rights and legal rights and obligations that apply within the Management Unit.

4.2 The Organization shall recognize and uphold the legal and customary rights of local communities to maintain control over management activities within or related to the Management Unit to the extent necessary to protect their rights, resources, lands and territories. Delegation by local communities of control over management activities to third parties requires Free, Prior and Informed Consent.

4.8 The Organization shall uphold the right of local communities to protect and utilise their traditional knowledge and shall compensate local communities for the utilization of such knowledge and their intellectual property. A binding agreement as per Criterion 3.3 shall be concluded between The Organization and the local communities for such utilization through Free, Prior and Informed Consent before utilization takes place, and shall be consistent with the protection of intellectual property rights.

PEFC (✓)

5.6.10 Forest management shall provide for effective communication and consultation with local people and other stakeholders relating to sustainable forest management and shall provide appropriate mechanisms for resolving complaints and disputes relating to forest management between forest operators and local people.

Tarapoto FMU (✓)

11.8 Mechanisms for consultation and the effective participation of local communities in the management of forest resources, depending upon the scale of management.

ITTO FMU (✓)

1.10. Public participation in forest management planning, decision-making, data collection, monitoring and assessment and for periodic monitoring, evaluation and feedback on progress.

7.14. Extent of involvement of indigenous peoples, local communities and other forest dwellers in forest management capacity-building, consultation processes, decision-making and implementation

Tarapoto CL (✓)

1.3 Indicators of Cultural, Social and Spiritual Needs and Values (...)

- Level of participation of local populations in the management and in the benefits generated by forest activities (...).

7.4 Degree of effective participation by civil society (academic institutions, grassroots groups, NGOs, trades unions and the private sector).

ITTO CL (✓)

1.1. Existence and implementation of policies, laws and regulations to govern forest management, including:

(d) participation of local communities and other stakeholders in forest management

1.10. Public participation in forest management planning, decision-making, data collection, monitoring and assessment and for periodic monitoring, evaluation and feedback on progress

7.14. Extent of involvement of indigenous peoples, local communities and other forest dwellers in forest management capacity-building, consultation processes, decision-making and implementation

ASI (~)

8.2 Extent of community, NGO and private sector participation in forestry activities

ATO (✓)

I.3.1. There is a direct, sustainable, efficient system to interest various stakeholders in protecting the forest against clearing, fires and poaching.

IV.2.1. Management techniques are well understood and applied by all stakeholders (forestry service, local population, timber industrialists).

IV.2.2. There is efficient communication between various stakeholders.

IV.2.3. All the parties involved participate in the management of natural resources in a manner accepted by all.

CILSS (✓)

7.8 Existence of an administrative, policy and legal framework for the effective participation of local communities, NGOs and the private sector in forest policy formulation, implementation and monitoring.

SADC (✓)

7.8. Existence of an administrative, policy and legal framework for the effective participation of local communities, NGOs and the private sector in forest policy formulation, implementation and monitoring.

Lepaterique CL (✓)

8.12. Local community participation in forestry activities and in the distribution of benefits.

Near East Process (✓)

Indicators of participation among stakeholders in forestry:

6.16 Grassroots participation and equity

6.19 Interest and contributions of the rural communities, media, NGO's, politicians and the public in general for the conservation and development of forests and forestry

MCFPE (~)

2 QUALITATIVE INDICATOR

B.10. Public awareness and participation

Montreal Process (~)

7.5.b Public participation and conflict resolution in forest-related decision making

7.2. Information transparency**FSC (✓)**

7.5 The Organization shall make publicly available a summary of the management plan free of charge. Excluding confidential information, other relevant components of the management plan shall be made available to affected stakeholders on request, and at cost of reproduction and handling.

7.6 The Organization shall, proportionate to scale, intensity and risk of management activities, proactively and transparently engage affected stakeholders in its management planning and monitoring processes, and shall engage interested stakeholders on request.

PEFC (✓)

5.6.10 Forest management shall provide for effective communication and consultation with local people and other stakeholders relating to sustainable forest management and shall provide appropriate mechanisms for resolving complaints and disputes relating to forest management between forest operators and local people

Tarapoto CL (~)

6.6 Degree of access to technology and information by different social groups.

ATO (✓)

IV.2.1. Management techniques are well understood and applied by all stakeholders (forestry service, local population, timber industrialists).

IV.2.2. There is efficient communication between various stakeholders.

IV.2.3. All the parties involved participate in the management of natural resources in a manner accepted by all.

8. Secure tenure of land

8.1. Compliance with the VGGT to secure land tenure and ownership

FSC (✓)

1.2. The Organization shall demonstrate that the legal status of the Management Unit, including tenure and use rights, and its boundaries, are clearly defined.

4.1 The Organization shall identify the local communities that exist within the Management Unit and those that are affected by management activities. The Organization shall then, through engagement with these local communities, identify their rights of tenure, their rights of access to and use of forest resources and ecosystem services, their customary rights and legal rights and obligations that apply within the Management Unit.

PEFC (✓)

5.6.3 Property rights and land tenure arrangements shall be clearly defined, documented and established for the relevant forest area. Likewise, legal, customary and traditional rights related to the forest land shall be clarified, recognised and respected.

ITTO FMU (✓)

1.2. Forest tenure and ownership.

7.12. Extent to which tenure and user rights of communities and indigenous peoples over publicly owned forests are recognized and practised

ITTO CL (✓)

1.2. Forest tenure and ownership.

7.12. Extent to which tenure and user rights of communities and indigenous peoples over publicly owned forests are recognized and practised

ATO (✓)

IV.1.2. Stakeholders' tenure rights are clear to all parties and are secure.

CILSS (✓)

7.2 Existence of a comprehensive legislative and regulatory framework providing for equitable access to resources, alternative forms of conflict resolution and consideration of land occupancy and cultural rights of local populations.

SADC (✓)

7.2 Existence of a comprehensive legislative and regulatory framework providing, e.g. equitable access to resources, alternative forms of conflict resolution and consideration of land occupancy and cultural rights of local populations

Lepaterique CL (✓)

1.8. A legal framework that guarantees respect for cultural values and for the use of forest resources in property of local dwellers with emphasis on indigenous communities.

8.9. Instrumentalisation to guarantee the proper application of international agreements and contracts in relation to the recognition of indigenous property rights. (United Nations International Labour Organization, Convention 169).

MCFPE (✓)

6.1 Forest holdings. Number of forest holdings, classified by ownership categories and size classes

Montreal Process (✓)

1.1.a Area and percent of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure.

7.3.a Clarity and security of land and resource tenure and property rights.

9. Employment and labour conditions**9.1. Full direct job equivalents along the full value chain****Tarapoto CL (✓)**

1.1 Indicators of Income, Production and Consumption

- (...)

- Employment and direct and indirect income from sustainable activities in the forest sector and generation of forest-based employment in relation to total national employment.

ASI (✓)

7: Socio-economic, cultural and spiritual needs

7.5 Direct and indirect employment in forestry and forest industries

CILSS (✓)

6.9 Employment generation and other social advantages

SADC (✓)

6.9 Number of people employed in forest sector

Near East Process (✓)

6.10 Employment generation in forest sector

MCFPE (✓)

6.5 Forest sector workforce. Number of persons employed and labour input in the forest sector, classified by gender and age group, education and job characteristics

2. QUALITATIVE INDICATOR.

B.9. Employment (incl. safety and health)

Montreal Process (✓)

6.3.a Employment in the forest sector

9.2. Full direct job equivalents in the biomass consuming region (or country)

FSC (✓)

4.3. The Organization shall provide reasonable opportunities for employment, training and other services to local communities, contractors and suppliers proportionate to scale and intensity of its management activities.

PEFC (✓)

5.6.1 Forest management planning shall aim to respect the multiple functions of forests to society, give due regard to the role of forestry in rural development, and especially consider new opportunities for employment in connection with the socio-economic functions of forests.

Tarapoto FMU (✓)

11.4 Impact of the economic use of the forest on the availability of forest resources of importance to local populations. Amount of direct and indirect employment, and income level.

ATO (✓)

IV.5.3. Forest-dependent people have opportunity to be employed and trained by forest companies.

CILSS (✓)

3.6 Percentage of the population employed in crop and livestock farming

6.12 Employment, opportunities and other advantages created notably in rural areas.

Lepaterique CL (✓)

8.3. Employment opportunities in forestry (direct, indirect) for women in local communities.

9.3. Human and labour rights

FSC (✓)

2.1 The Organization shall uphold the principles and rights at work as defined in the ILO Declaration on Fundamental Principles and Rights at Work (1998) based on the eight ILO Core Labour Conventions.

3. Indigenous Peoples' Rights: The Organization shall identify and uphold indigenous peoples' legal and customary rights of ownership, use and management of land, territories and resources affected by management activities.

4.2. The Organization shall recognize and uphold the legal and customary rights of local communities to maintain control over management activities within or related to the Management Unit to the extent necessary to protect their rights, resources, lands and territories. Delegation by local communities of control over management activities to third parties requires Free, Prior and Informed Consent.

PEFC (✓)

5.6.4 Forest management activities shall be conducted in recognition of the established framework of legal, customary and traditional rights such as outlined in ILO 169 and the UN Declaration on the Rights of Indigenous Peoples, which

shall not be infringed upon without the free, prior and informed consent of the holders of the rights, including the provision of compensation where applicable. Where the extent of rights is not yet resolved or is in dispute there are processes for just and fair resolution. In such cases forest managers shall, in the interim, provide meaningful opportunities for parties to be engaged in forest management decisions whilst respecting the processes and roles and responsibilities laid out in the policies and laws where the certification takes place.

5.6.13 Forest management shall comply with fundamental ILO conventions. Note: In countries where the fundamental ILO conventions have been ratified, the requirements of 5.7.1 apply. In countries where a fundamental convention has not been ratified and its content is not covered by applicable legislation, specific requirements shall be included in the forest management standard.

ATO (~)

No indicators related to Criterion 0.4 (Criterion 0.4. At international level, the government has ratified or approved treaties, conventions or recommendations on sustainable development of forests issued especially by such organizations as ILO, CITES, ITTO, FAO, UNCED)

IV.5.1. Damages caused are compensated for in a fair manner.

IV.5.2. Wages and other benefits conform to national standards.

IV.5.3. Forest-dependent people have opportunity to be employed and trained by forest companies.

IV.5.4. Forest utilization is based on necessary compromises and complementarities.

Lepaterique CL (✓)

8.10. Fulfilment of commitments related to international agreements and conventions on indigenous rights (ILO Convention 169).

9.4. Occupational safety and health for workers

FSC (✓)

2.3 The Organization shall implement health and safety practices to protect workers from occupational safety and health hazards. These practices shall, proportionate to scale, intensity and risk of management activities, meet or

exceed the recommendations of the ILO Code of Practice on Safety and Health in Forestry Work.

PEFC (✓)

5.6.11 Forestry work shall be planned, organised and performed in a manner that enables health and accident risks to be identified and all reasonable measures to be applied to protect workers from work-related risks. Workers shall be informed about the risks involved with their work and about preventive measures. 5.6.12 Working conditions shall be safe, and guidance and training in safe working practices shall be provided to all those assigned to a task in forest operations. Note: Guidance for specifying national standards can be obtained from the ILO Code of Good Practice: Safety and Health in Forestry Work.

ITTO FMU (✓)

7.8. Existence and implementation of procedures to ensure the health and safety of forest workers

ITTO CL (✓)

7.8. Existence and implementation of procedures to ensure the health and safety of forest workers

ATO (✓)

IV.3.1. Necessary preventive measures are taken by concessionaires or the managers to minimize and possibly to take into account health risks linked to forest activities.

MCFPE (✓)

6.6 Occupational safety and health Frequency of occupational accidents and occupational diseases in forestry.

2. QUALITATIVE INDICATOR.

B.9. Employment (incl. safety and health)

10. Health Risks

10.1. Risks to public health

FSC (~)

10.7 The Organization shall use integrated pest management and silviculture systems which avoid, or aim at eliminating, the use of chemical pesticides. The

Organization shall not use any chemical pesticides prohibited by FSC policy. When pesticides are used, The Organization shall prevent, mitigate, and / or repair damage to environmental values and human health.

PEFC (~)

5.6.2 Forest management shall promote the long-term health and well-being of communities within or adjacent to the forest management area.

11. Food security

11.1 Risks for negative impacts on price and supply of national food basket and fuelwood.

ASI (~)

7.1 The Degree of contribution of forest management activities to food security including other livelihood needs

CILSS (~)

6.11 Level of contribution to food security.

SADC (~)

6.12. Contributions to food security

Near East Process (~)

6.15 Contribution to food security

1.2. Agricultural schemes

In Table 2 the benchmark and gap analysis of the selected agricultural schemes against the (draft) S2Biom indicators is shown.

Table 2 *Benchmark and Gap analysis of the selected Agricultural Schemes against the (draft) S2Biom Indicators*

Theme	Criteria	#	S2Biom Indicator	SAFA	SAN	RSPO	RTRS	Bonsucro	CAP
ENVIRONMENTAL	1. Resource Efficiency	1.1	Land use efficiency						
		1.2	Secondary resource efficiency						
		1.3	Energy efficiency	~	✓	✓		✓	✓
		1.4	Functionality (output service quality)						
	2. Climate change	2.1	Life cycle GHG emissions (CO ₂ eq) including direct LUC	✓	~	✓	✓	✓	✓
		2.2	Other GHG emissions	~					
	3. Biodiversity	3.1	Protected areas and land with significant biodiversity values	~	✓	✓	✓	✓	✓
		3.2	Biodiversity conservation and management	✓	✓	✓	✓	✓	✓
	4. Soil	4.1	Erosion	~	✓	✓	✓	~	✓
		4.2	Soil Organic C	✓	✓	✓	✓	~	✓
		4.3	Soil nutrient balance	✓	✓	✓	✓	~	
	5. Water	5.1	Water availability and regional water stress	✓	✓	✓	✓		✓
		5.2	Water use efficiency	✓	✓	✓		✓	✓
		5.3	Water quality	✓	✓	✓	✓	✓	✓
	6. Air	6.1	SO ₂ equivalents	~		✓		✓	
		6.2	PM ₁₀	~		✓		✓	
SOCIAL	7. Participat ion and	7.1	Effective participatory process	✓		✓	~	✓	

Theme	Criteria	#	S2Biom Indicator	SAFA	SAN	RSPO	RTRS	Bonsucro	CAP	
		7.2	Information transparency	✓	✓	✓	~	✓		
	8. Secure tenure of land	8.1	Compliance with the VGGT to secure land tenure and ownership	✓	✓	✓	✓	✓		
	9. Employment and labour conditions	9.1	Full direct job equivalents along the full value chain							
		9.2	Full direct job equivalents in the biomass consuming region (or country)	✓	✓		✓			
		9.3	Human and labour rights	✓	✓	✓	✓	✓		
		9.4	Occupational safety and health for workers	✓	✓	✓	✓	✓		
	10. Health Risks	10.1	Risks to public health	✓	✓		✓		~	
	11. Food security	11.1	Risks for negative impacts on price and supply of national food basket and fuelwood.							
ECONOMIC	12. Production costs	12.1	Levelised life-cycle cost, excluding subsidies (including CAPEX, OPEX)	✓						

1. Resource efficiency

1.3. Energy Efficiency

SAFA (~)

E 5.2.2. Energy Saving Practices: To achieve a sustainable energy use in food and agriculture value chains, energy use will need to be reduced, preferably by enhancing energy efficiency, and the energy system needs to be reverted to renewable and sustainable energy sources. This indicator serves to check for practices that reduce the energy needs of the analysed enterprise, both in absolute terms and per unit of product.

SAN (✓)

1.11 The farm must annually describe its energy sources and the amount of energy used from each source for production processes, transport and domestic use within the farm limits. The farm must have an energy efficiency plan with goals and implementation activities for increased efficiency, for reducing dependency on non-renewable sources and for increasing the use of renewable energy. Where appropriate, the use of on-farm energy sources must be preferred.

RSPO (✓)

5.4.1 A plan for improving efficiency of the use of fossil fuels and to optimise renewable energy shall be in place and monitored.

Bonsucro (✓)

5.4.1. Total Net Primary Energy Usage per kg product (kJ/kg)

5.4.2 Energy used in cane transport per ton cane transported (MJ/t cane)

5.4.3. Primary energy use per ton of sugarcane (MJ/t)

CAP (✓)

(EU) No 1305/2013

(5) promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors, with a focus on the following areas:

(b) increasing efficiency in energy use in agriculture and food processing;

2. Climate change

2.1. Life cycle GHG emissions (CO₂eq), including direct LUC

SAFA (✓)

E 1.1.3. GHG Balance. GHG Balance refers to the difference between the direct (and indirect) GHG emissions and the on-site sequestration by the enterprise.

SAN (~)

10.6 The farm must implement practices to diminish its emissions of greenhouse gases and increase carbon dioxide sequestration. Such practices include soil cover management, planting trees and other perennial vegetation, proper sourcing and management of fertilisers and fuels, management of effluent ponds and manure, proper waste management, use of clean technologies, improvement of energy efficiency, reduction in tillage, and participation in local or regional initiatives aimed at greenhouse gas reduction and carbon dioxide sequestration.

RSPO (✓)

5.6.2 (M) Significant pollutants and greenhouse gas (GHG) emissions shall be identified, and plans to reduce or minimise them implemented.

7.8.1 (M) The carbon stock of the proposed development area and major potential sources of emissions that may result directly from the development shall be identified and estimated.

7.8.2 There shall be a plan to minimise net GHG emissions which takes into account avoidance of land areas with high carbon stocks and/or sequestration options.

RTRS (✓)

(Criterion 4.3 Efforts are made to reduce emissions and increase sequestration of Greenhouse Gases (GHGs) on the farm)

Bonsucro (✓)

3.2.1 Net GHG emissions per ton of cane

3.2.2 Net GHG emissions per ton of sugar

3.2.3 Net GHG emissions per MJ of ethanol

CAP (✓)

(EU) No 1305/2013

(5) promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors, with a focus on the following areas:

(d) reducing green house gas and ammonia emissions from agriculture;

2.2. Other GHG emissions

SAFA (~)

E 1.1.3. GHG Balance. GHG Balance refers to the difference between the direct (and indirect) GHG emissions and the on-site sequestration by the enterprise.

3. Biodiversity

3.1. Protected areas and land with significant biodiversity values

SAFA (~)

E 4.1.1. Landscape/Marine Habitat Conservation Plan: This indicator serves to check whether the enterprise has a plan in place that targets the conservation and/or rehabilitation of a diversity of habitats in or adjacent to the site(s) of its operations.

E.4.1.5. Land Use and Land Cover Change: This indicator measures whether natural or near-natural habitats (e.g. wetlands, primary forests, grasslands, protected waterways, mangrove forests) or structurally complex land use systems (e.g. grasslands, agroforestry, polycultures) have been replaced by ecologically less valuable forms of land use or land cover due to the enterprise's operations during the last 20 years.

SAN (✓)

2.2 Critical Criterion. From the date of application for certification onwards, the farm must not destroy any natural ecosystem. Additionally, from November 1, 2005 onwards no high value ecosystems must have been destroyed by or due to purposeful farm management activities. If any natural ecosystems have been destroyed by or due to purposeful farm management activities between November 1, 1999 and November 1, 2005, the farm must implement the following analysis and mitigations:

- a. Conduct an analysis of the ecosystem destruction to document the scope and ecological impact of the destruction.
- b. Develop a mitigation plan with advice from a competent professional that is consistent with applicable legislation and that compensates for the negative impact.
- c. Implement the activities of this mitigation plan, including for example the set aside of a significant percentage of the farm area for conservation purposes.

2.3 Production areas must not be located in places that could provoke negative effects on national parks, wildlife refuges, biological corridors, forestry reserves, buffer zones or other public or private biological conservation areas.

2.6 Aquatic ecosystems must be protected from erosion and agrochemical drift and runoff by establishing protected zones on the banks of rivers, permanent or temporary streams, creeks, springs, lakes, wetlands and around the edges of other natural water bodies. Distances between crop plants and aquatic ecosystems as indicated in Annex 1 must be respected. Farms must not alter natural water channels to create new drainage or irrigation canals. Previously converted water channels must maintain their natural vegetative cover or, in its absence, this cover must be restored. The farm must use and expand vegetative ground covers on the banks and bottoms of drainage canals.

RSPO (✓)

5.2.1 (M) Information shall be collated in a High Conservation Value (HCV) assessment that includes both the planted area itself and relevant wider landscape-level considerations (such as wildlife corridors).

7.3.1 (M) There shall be evidence that no new plantings have replaced primary forest, or any area required to maintain or enhance one or more High Conservation Values (HCVs), since November 2005. New plantings shall be planned and managed to best ensure the HCVs identified are maintained and/or enhanced (see Criterion 5.2).

7.3.2 (M) A comprehensive HCV assessment, including stakeholder consultation, shall be conducted prior to any conversion or new planting. This shall include a land use change analysis to determine changes to the vegetation since November 2005. This analysis shall be used, with proxies, to indicate changes to HCV status.

7.3.3 Dates of land preparation and commencement shall be recorded.

7.3.4 (M) An action plan shall be developed that describes operational actions consequent to the findings of the HCV assessment, and that references the grower's relevant operational procedures (see Criterion 5.2).

7.3.5 Areas required by affected communities to meet their basic needs, taking into account potential positive and negative changes in livelihood resulting from proposed operations, shall be identified in consultation with the communities and incorporated into HCV assessments and management plans (see Criterion 5.2).

RTRS (✓)

(Criterion 4.4 Expansion of soy cultivation is responsible)

Note: This criterion will be revised after June 2012 if RTRS-approved maps and system are not available.

4.4.1 After May 2009 expansion for soy cultivation has not taken place on land cleared of native habitat except under the following conditions:

4.4.1.1 It is in line with an RTRS-approved map and system (see Annex 4.)

or

4.4.1.2 Where no RTRS-approved map and system is available:

a) Any area already cleared for agriculture or pasture before May 2009 and used for agriculture or pasture within the past 12 years can be used for soy expansion, unless regenerated vegetation has reached the definition of native forest (see glossary).

b) There is no expansion in native forests (see glossary)

c) In areas that are not native forest (see glossary), expansion into native habitat only occurs according to one of the following two options:

Option 1. Official land-use maps such as ecological-economic zoning are used and expansion only occurs in areas designated for expansion by the zoning. If there are no official land use maps then maps produced by the government under the Convention on Biological Diversity (CBD) are used, and expansion only occurs outside priority areas for conservation shown on these maps.

Option 2. An High Conservation Value Area (HCVA) assessment is undertaken prior to clearing and there is no conversion of High Conservation Value Areas.

Note: Where neither official land use maps nor CBD maps exist, Option 2 must be followed.

4.4.2 There is no conversion of land where there is an unresolved land use claim by traditional land users under litigation, without the agreement of both parties.

Bonsucro (✓)

4.1.2 Percentage of areas defined internationally as legally protected or classified as of High Conservation Value planted to sugarcane after the cut-off date of 1 January 2008

5.7.1 Percentage of greenfield expansion or new sugarcane project covered by ESIA

CAP (✓)

(EU) No 1307/2013. Chapter 3, Article 46 (1-9). Agricultural practices beneficial for the climate and the environment: Having Ecological Focus Area (EFAs) on the agricultural area.

(EU) No 1307/2013. Chapter 3, Article 45 (1-7). Agricultural practices beneficial for the climate and the environment: Permanent grasslands

NOTE: other EU (and MS) legislation also consider protected areas

3.2. Biodiversity conservation and management

SAFA (✓)

E 4.1.2. Ecosystem Enhancing Practices: To ensure the effective conservation or improvement of complex ecosystems, including those with agricultural and/or forest components, a broad landscape approach is critical. Within this context, this indicator refers to all practices that aim at enhancing functional relationships and processes within ecosystems by different actors in agriculture-based food chains. Many practices can potentially enhance these functionalities, such as greater diversity of plants and animals (including fish), soil coverage, cultivation of perennials, maintenance of semi natural habitats with native vegetation and flowers and creation of pest suppressive conditions.

E 4.2.2. Species Conservation Practices: This indicator intends to capture all activities and practices that the operation has implemented which effectively protect and rehabilitate populations of wild plants and animals on or adjacent to the analysed enterprise's operations during the analysed time-frame.

E 4.2.3. Diversity and Abundance of Key Species: This indicator serves to determine how diversity and abundance of threatened and vulnerable wild

species on the one hand, and invasive species on the other, have developed in, and adjacent to, the enterprise's operations during the analysed timeframe.

E 4.3.1. Wild Genetic Diversity Enhancing Practices: This indicator intends to capture all activities and practices that the enterprise has implemented which have enhanced the genetic diversity of wild species on or adjacent to, the enterprise's operations during the analysed timeframe.

E 4.3.2. Agro-biodiversity in-situ Conservation: This indicator refers to the protection, in-situ conservation and rehabilitation of the genetic diversity of domesticated plant and animal and aquaculture fish species in agriculture-based food chains. Genetic resources hold the key to increasing food security and improving livelihoods.

SAN (✓)

E 4.1.2. Ecosystem Enhancing Practices: To ensure the effective conservation or improvement of complex ecosystems, including those with agricultural and/or forest components, a broad landscape approach is critical. Within this context, this indicator refers to all practices that aim at enhancing functional relationships and processes within ecosystems by different actors in agriculture-based food chains. Many practices can potentially enhance these functionalities, such as greater diversity of plants and animals (including fish), soil coverage, cultivation of perennials, maintenance of semi natural habitats with native vegetation and flowers and creation of pest suppressive conditions.

E 4.2.2. Species Conservation Practices: This indicator intends to capture all activities and practices that the operation has implemented which effectively protect and rehabilitate populations of wild plants and animals on or adjacent to the analysed enterprise's operations during the analysed time-frame.

E 4.2.3. Diversity and Abundance of Key Species: This indicator serves to determine how diversity and abundance of threatened and vulnerable wild species on the one hand, and invasive species on the other, have developed in, and adjacent to, the enterprise's operations during the analysed timeframe.

E 4.3.1. Wild Genetic Diversity Enhancing Practices: This indicator intends to capture all activities and practices that the enterprise has implemented which have enhanced the genetic diversity of wild species on, or adjacent to, the enterprise's operations during the analysed timeframe.

E 4.3.2. Agro-biodiversity in-situ Conservation: This indicator refers to the protection, in-situ conservation and rehabilitation of the genetic diversity of domesticated plant and animal and aquaculture fish species in agriculture-based

food chains. Genetic resources hold the key to increasing food security and improving livelihoods.

RSPO (✓)

(Criterion 4.5. Pests, diseases, weeds and invasive introduced species are effectively managed using appropriate Integrated Pest Management techniques)

(Criterion 5.2. The status of rare, threatened or endangered species and other High Conservation Value habitats, if any, that exist in the plantation or that could be affected by plantation or mill management, shall be identified and operations managed to best ensure that they are maintained and/or enhanced)

5.2.1 (M) Information shall be collated in a High Conservation Value (HCV) assessment that includes both the planted area itself and relevant wider landscape-level considerations (such as wildlife corridors).

5.2.2 (M) Where rare, threatened or endangered (RTE) species, or HCVs, are present or are affected by plantation or mill operations, appropriate measures that are expected to maintain and/or enhance them shall be implemented through a management plan.

5.2.3 There shall be a programme to regularly educate the workforce about the status of these RTE species, and appropriate disciplinary measures shall be instigated in accordance with company rules and national law if any individual working for the company is found to capture, harm, collect or kill these species.

5.2.4 Where a management plan has been created there shall be ongoing monitoring:

- The status of HCV and RTE species that are affected by plantation or mill operations shall be documented and reported;
- Outcomes of monitoring shall be fed back into the management plan.

5.2.5 Where HCV set-asides with existing rights of local communities have been identified, there shall be evidence of a negotiated agreement that optimally safeguards both the HCVs and these rights.

RTRS (✓)

(Criterion 4.5 On-farm biodiversity is maintained and safeguarded through the preservation of native vegetation)

4.5.1 There is a map of the farm which shows the native vegetation.

4.5.2 There is a plan, which is being implemented, to ensure that the native vegetation is being maintained (except areas covered under Criterion 4.4)

4.5.3 No hunting of rare, threatened or endangered species takes place on the property.

(Criterion 5.10. Appropriate measures are implemented to allow for coexistence of different production systems)

Guidance: When a change in soybean production practices is introduced which could impact on neighbouring production systems, it is the responsibility of the producer making the change to implement a buffer strip of 30 m (e.g. in areas where production is generally GM, it is the responsibility of an organic or non-GM farmer to maintain the buffer around his own production. In areas where production is mainly non-GM or organic, a farmer planting GM or using chemicals should maintain a buffer).

Bonsucro (✓)

(Criterion 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)

5.7.1 Percentage of greenfield expansion or new sugarcane project covered by ESIA

CAP (✓)

(EU) No 1307/2013. Chapter 3, Article 44 (1-5). Agricultural practices beneficial for the climate and the environment: Crop diversification.

(EU) No 1307/2013. Chapter 3, Article 46 (1-9). Agricultural practices beneficial for the climate and the environment: Having Ecological Focus Area (EFAs) on the agricultural area.

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Environment, climate change, good agricultural condition of land: Biodiversity

4. Soil

4.1. Erosion

SAFA (~)

E 3.2.3. Net Loss /Gain of Productive Land: This indicator captures the balance between rehabilitated land and degraded land on the enterprise's sites. The loss of productive capacity can be estimated by assessing the degree of soil degradation – by water erosion, wind erosion, compaction, salinization, nutrient mining or chemical pollution – on the respective areas

SAN (✓)

9.1 The farm must execute a soil erosion prevention and control program that minimizes the risk of erosion and reduces existing erosion. The program activities must be based on the identification of soils affected by or susceptible to erosion, as well as soil properties and characteristics, climatic conditions, topography and agricultural practices for the crop. Special emphasis must be placed on controlling runoff and wind erosion from newly tilled or planted areas, as well as preventing sedimentation of water bodies. The farm must use and expand vegetative ground covers on the banks and bottoms of drainage canals to reduce erosion and agrochemical drift and runoff towards water bodies.

9.3 The farm must use and expand its use of vegetative ground cover to reduce erosion and improve soil fertility; structure and organic material content, as well as minimize the use of herbicides. There must be a vegetative ground cover establishment and expansion plan that indicates the areas with existing cover, as well as areas where cover will be established in the future. The farm must include a timeframe for these activities.

RSPO (✓)

(Criterion 4.3. Practices minimise and control erosion and degradation of soils)

4.3.1 (M) Maps of any fragile soils shall be available.

4.3.2 A management strategy shall be in place for plantings on slopes above a certain limit (this needs to be soil and climate specific).

4.3.3 A road maintenance programme shall be in place.

4.3.4 (M) Subsidence of peat soils shall be minimised and monitored. A documented water and ground cover management programme shall be in place.

4.3.5 Drainability assessments shall be required prior to replanting on peat to determine the long-term viability of the necessary drainage for oil palm growing.

4.3.6 A management strategy shall be in place for other fragile and problem soils (e.g. sandy, low organic matter, acid sulphate soils).

RTRS (✓)

5.1.1 Good agricultural practices are implemented to minimize diffuse and localized impacts on surface and ground water quality from chemical residues, fertilisers, erosion or other sources and to promote aquifer recharge.

5.3.1 Knowledge of techniques to maintain soil quality (physical, chemical and biological) is demonstrated and these techniques are implemented

5.3.2 Knowledge of techniques to control soil erosion is demonstrated and these techniques are implemented

(Criterion 7.4 Extensive planting on steep terrain, and/or marginal and fragile soils, including peat, is avoided)

7.4.1 Maps identifying marginal and fragile soils, including excessive gradients and peat soils, shall be available and used to identify areas to be avoided

7.4.2 (M) Where limited planting on fragile and marginal soils, including peat, is proposed, plans shall be developed and implemented to protect them without incurring adverse impacts.

Bonsucro (~)

5.2.4 Soil surface mechanically tilled per year (% of cultivated area). NOTES: To minimise the opportunity for erosion. Percentage of soil surface tilled per year. Only tillage wider 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.

4.1.2. Percentage of areas defined internationally or nationally as legally protected or classified as of High Conservation Value planted to sugarcane after the cut-off date

of 1 January 2008. HCV 4 Areas that provide basic services of nature in critical situations (e.g. watershed protection, erosion control)

CAP (✓)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Environment, climate change, good agricultural condition of land: Soil and carbon stock

4.2. Soil Organic C

SAFA (✓)

E 3.1.5. Soil Organic Matter: Soil Organic Matter is considered to be an indicator for soil quality and productivity influencing physical, chemical and biological properties of the soils. This indicator measures the share of the utilised land where content and qualities of soil organic matter are high in consideration of the local climate and bedrock. As a minimum, soil organic matter content (quantity) should be measured.

SAN (✓)

9.2 The farm must have a soil or crop fertilization program based on soil characteristics and properties, periodic soil or foliage sampling and analysis, and advice from a competent and impartial professional or authority. The number of soil or foliage samples must correspond with the size of the production area, types of soil, and variations in its properties, as well as results of previous analyses. The producer must keep the results of these analyses on the farm for a two-year period. Organic and non-organic fertilisers must be applied so as to avoid any potential negative impacts on the environment. The farm must give priority to organic fertilization using residues generated by the farm.

9.3 The farm must use and expand its use of vegetative ground cover to reduce erosion and improve soil fertility; structure and organic material content, as well as minimize the use of herbicides. There must be a vegetative ground cover establishment and expansion plan that indicates the areas with existing cover, as well as areas where cover will be established in the future. The farm must include a timeframe for these activities.

RSPO (✓)

4.2.1 There shall be evidence that good agriculture practices, as contained in Standard Operating Procedures (SOPs), are followed to manage soil fertility to a level that ensures optimal and sustained yield, where possible. Guidance: Long-term fertility depends on maintaining the structure, organic matter content, nutrient status and microbiological health of the soil.

RTRS (✓)

4.3.3. Soil organic matter is monitored to quantify change in soil carbon and steps are taken to mitigate negative trends.

5.3.1 Knowledge of techniques to maintain soil quality (physical, chemical and biological) is demonstrated and these techniques are implemented

5.3.3 Appropriate monitoring, including soil organic matter content, is in place.

Bonsucro (~)

5.2.3 % Ground cover of tops or leaves after harvest

5.2.5 Percentage fields with samples showing analyses within acceptable limits for pH

CAP (✓)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Environment, climate change, good agricultural condition of land: Soil and carbon stock

4.3. Soil nutrient balance

SAFA (✓)

E 3.1.3. Soil Chemical Quality: The chemical quality of soils is a complex phenomenon that can be approached through a multitude of parameters, including pH value, electrical conductivity, cation exchange capacity, base saturation and the contents (total, dissolved, plant-available, etc.) of various chemical elements and molecules.

SAN (✓)

9.2 The farm must have a soil or crop fertilization program based on soil characteristics and properties, periodic soil or foliage sampling and analysis, and advice from a competent and impartial professional or authority. The number of soil or foliage samples must correspond with the size of the production area, types of soil, and variations in its properties, as well as results of previous analyses. The producer must keep the results of these analyses on the farm for a two-year period. Organic and non-organic fertilisers must be applied so as to avoid any potential negative impacts on the environment. The farm must give priority to organic fertilization using residues generated by the farm.

9.3 The farm must use and expand its use of vegetative ground cover to reduce erosion and improve soil fertility; structure and organic material content, as well as minimize the use of herbicides. There must be a vegetative ground cover establishment and expansion plan that indicates the areas with existing cover, as well as areas where cover will be established in the future. The farm must include a timeframe for these activities.

RSPO (✓)

4.2.1 There shall be evidence that good agriculture practices, as contained in Standard Operating Procedures (SOPs), are followed to manage soil fertility to a level that ensures optimal and sustained yield, where possible.

4.2.3 There shall be evidence of periodic tissue and soil sampling to monitor changes in nutrient status.

4.2.4 A nutrient recycling strategy shall be in place, and may include use of Empty Fruit Bunches (EFB), Palm Oil Mill Effluent (POME), and palm residues after replanting.

RTRS (✓)

5.3.1 Knowledge of techniques to maintain soil quality (physical, chemical and biological) is demonstrated and these techniques are implemented

Bonsucro (~)

5.2.5 Percentage fields with samples showing analyses within acceptable limits for pH

5. Water***5.1. Water availability and regional water stress*****SAFA (✓)**

E 2.1.3. Ground and Surface Water Withdrawals: Ground and surface water withdrawals aim to put the freshwater withdrawals for the enterprise in relation with the regionally available freshwater resources, that the annual rainfall, annual groundwater recharge and water carried into the region by allochthonous rivers. This indicator measures the share of the annual withdrawals of ground and surface water as a percentage of total renewable water resources available over the same period of time.

SAN (✓)

E 2.1.3. Ground and Surface Water Withdrawals: Ground and surface water withdrawals aim to put the freshwater withdrawals for the enterprise in relation with the regionally available freshwater resources, that the annual rainfall, annual groundwater recharge and water carried into the region by allochthonous rivers. This indicator measures the share of the annual withdrawals of ground and

surface water as a percentage of total renewable water resources available over the same period of time.

RSPO (✓)

(Criterion 4.4. Practices maintain the quality and availability of surface and ground water)

4.4.1 An implemented water management plan shall be in place.

4.4.2 (M) Protection of water courses and wetlands, including maintaining and restoring appropriate riparian and other buffer zones (refer to national best practice and national guidelines) shall be demonstrated.

RTRS (✓)

5.1.1 Good agricultural practices are implemented to minimize diffuse and localized impacts on surface and ground water quality from chemical residues, fertilisers, erosion or other sources and to promote aquifer recharge.

5.1.2 There is monitoring, appropriate to scale, to demonstrate that the practices are effective.

5.1.4 Where irrigation is used, there is a documented procedure in place for applying best practices and acting according to legislation and best practice guidance (where this exists), and for measurement of water utilization.

5.2.3 Natural wetlands are not drained and native vegetation is maintained.

CAP (✓)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Environment, climate change, good agricultural condition of land: Water

5.2. Water use efficiency

SAFA (✓)

E 2.1.2. Water Conservation Practices: This indicator refers to all practices that aim at saving water in agriculture and fisheries-based food chains. Water conservation refers to any beneficial reduction of water loss, use or waste. Many practices can potentially conserve water, such as maximizing the efficiency of irrigation systems, rainwater harvesting, cultivation of water-efficient crops, use of less water-demanding processing technologies, etc.

SAN (✓)

4.1 The farm must have a water conservation program that ensures the rational use of water resources. The program activities must make use of the best available technology and resources. It must consider water re-circulation and reuse, maintenance of the water distribution network and the minimizing of water use. The farm must keep an inventory and indicate on a map the surface and underground water sources found on the property. The farm must record the annual water volume provided by these sources and the amount of water consumed by the farm.

RSPO (✓)

4.4.4 Mill water use per ton of Fresh Fruit Bunches (FFB) shall be monitored.

Bonsucro (✓)

5.2.1 Net water consumed per unit mass of product

5.2.2 For irrigated cane, efficient use of water

CAP (✓)

(EU) No 1305/2013

(5) promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors, with a focus on the following areas:

(a) increasing efficiency in water use by agriculture;

5.3. Water quality**SAFA (✓)**

E 2.2.3. Concentration of Water Pollutants: It measures the percentage of days of the year when relevant water quality thresholds have been exceeded in water bodies (including ground and surface water, coastal and marine water) due to effluents from the operations.

E 2.2.4. Wastewater Quality: It measures the share of wastewater with a good water quality (e.g. concentrations of faecal coliform, heavy metals, BOD and COD) as a percentage of the total wastewater of operations. A good water quality is given if the quantity and quality of discharged wastewater cause no harm to human, plant, animal and ecosystem health. This means that wastewater

treatment methods have to be adapted to the quantities and pollutant charge, as well as the intended method of discharge of the treated water.

SAN (✓)

4.5 Critical Criterion. The farm must not discharge or deposit industrial or domestic wastewater into natural water bodies without demonstrating that the discharged water complies with the respective legal requirements, and that the wastewater's physical and biochemical characteristics do not degrade the receiving water body (...)

4.6 Farms that discharge wastewater continuously or periodically into the environment must establish a water-quality monitoring and analysis program that takes into account potential contaminants and applicable laws (...)

4.9 If total or partial compliance with the requirements of this standard that relate directly or indirectly to the contamination of natural water bodies cannot be proven, the farm must conduct a surface-water quality monitoring and analysis program.(...)

RSPO (✓)

4.4.3 Appropriate treatment of mill effluent to required levels and regular monitoring of discharge quality, especially Biochemical Oxygen Demand (BOD), shall be in compliance with national regulations

RTRS (✓)

5.1.1 Good agricultural practices are implemented to minimize diffuse and localized impacts on surface and ground water quality from chemical residues, fertilisers, erosion or other sources and to promote aquifer recharge

5.1.2 There is monitoring, appropriate to scale, to demonstrate that the practices are effective.

5.1.3 Any direct evidence of localized contamination of ground or surface water is reported to, and monitored in collaboration with local authorities.

Bonsucro (✓)

4.1.1 Dissolved oxygen in receiving stream

CAP (✓)

(EU) No 1306/2013.Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Environment, climate change, good agricultural condition of land: Water

6. Air

6.1. SO₂ equivalents

SAFA (~)

E 1.2.3. Ambient Concentration of Air Pollutants: This indicator uses ambient levels of air pollutants as a proxy of air quality. Air pollution is measured through the concentrations of particulate matter, ozone, sulphur dioxide, nitrous oxides, volatile organic compounds, smoke and odours.

RSPO (✓)

5.6.1 (M) An assessment of all polluting activities shall be conducted, including gaseous emissions, particulate/soot emissions and effluent

5.6.2 (M) Significant pollutants and greenhouse gas (GHG) emissions shall be identified, and plans to reduce or minimise them implemented.

5.6.3 A monitoring system shall be in place, with regular reporting on progress for these significant pollutants and emissions from estate and mill operations, using appropriate tools.

Bonsucro (✓)

5.5.1 Atmospheric acidification burden per unit mass product

6.2. PM₁₀

SAFA (~)

E 1.2.3. Ambient Concentration of Air Pollutants: This indicator uses ambient levels of air pollutants as a proxy of air quality. Air pollution is measured through the concentrations of particulate matter, ozone, sulphur dioxide, nitrous oxides, volatile organic compounds, smoke and odours.

RSPO (✓)

5.6.1 (M) An assessment of all polluting activities shall be conducted, including gaseous emissions, particulate/soot emissions and effluent

5.6.2 (M) Significant pollutants and greenhouse gas (GHG) emissions shall be identified, and plans to reduce or minimise them implemented.

5.6.3 A monitoring system shall be in place, with regular reporting on progress for these significant pollutants and emissions from estate and mill operations, using appropriate tools.

BONSUCRO (✓)

(Criterion 5.5 To reduce emissions and effluents. To promote recycling of waste streams where practical)

5.5.2 Nonhazardous solid residues of production per ton cane

7. Participation and transparency

7.1. Effective participatory processes

SAFA (✓)

G 3.1.4 Effective participation. Stakeholder engagement is of greatest value when an organization can incorporate the views of its stakeholders in its decision-making. Demonstrating how stakeholder engagement has influenced the enterprise's decisions is the test which is applied. The process of this enquiry is likely to lead to enhanced stakeholder engagement and a greater value being placed on stakeholder views. Giving stakeholders feedback about how their engagement was used and what it has changed is important to maintain trust and build the relationships that encourage proactive dialogue from stakeholders. Failure to ensure effective feedback can contribute to consultation fatigue.

G.4.4.1. Free, Prior and Informed Consent: (...) The principles of Free, Prior and Informed Consent (FPIC) have been developed through extensive consultation to protect communities from unscrupulous resource exploitation and misappropriation. They also provide guidance for enterprises on how to work fairly with communities and some degree of protection to the organization's reputation. Critical to the effective operation of PFIC is the ability for the affected community to be informed (...).

RSPO (✓)

1.1.1 There shall be evidence that growers and millers provide adequate information on (environmental, social and/or legal) issues relevant to RSPO Criteria to relevant stakeholders for effective participation in decision making.

(Criterion 2.3 Use of the land for oil palm does not diminish the legal, customary or user rights of other users without their free, prior and informed consent)

2.3.2 Copies of negotiated agreements detailing the process of free, prior and informed consent (FPIC) shall be available and shall include:

- a) Evidence that a plan has been developed through consultation and discussion with all affected groups in the communities, and that information has been provided to all affected groups, including information on the steps that shall be taken to involve them in decision making;
- b) Evidence that the company has respected communities' decisions to give or withhold their consent to the operation at the time that this decision was taken;
- c) Evidence that the legal, economic, environmental and social implications for permitting operations on their land have been understood and accepted by affected communities, including the implications for the legal status of their land at the expiry of the company's title, concession or lease on the land.

(Criterion 6.1) Aspects of plantation and mill management that have social impacts, including replanting, are identified in a participatory way, and plans to mitigate the negative impacts and promote the positive ones are made, implemented and monitored, to demonstrate continual improvement.

RTRS (~)

3.2.1. In the case of disputed use rights, a comprehensive, participatory and documented community rights assessment is carried out.

3.2.2 Where rights have been relinquished by traditional land users there is documented evidence that the affected communities are compensated subject to their free, prior, informed and documented consent.

Bonsucro (✓)

5.7.1 Percentage of greenfield expansion or new sugarcane project covered by ESIA. Cut-off date 1 January 2008. ESIA process shall start prior the formulation phase of a project, focus on significant issues and involve key stakeholders to identify them, provide information on possible alternative or appropriate mitigation measures for making decision based on free prior informed consent (FPIC) process, monitor and evaluate implemented measures. The operator shall involve independent third party experts.

(Criterion 5.8 To ensure active engagement and transparent, consultative and participatory processes with all relevant stakeholders)

5.8.1 Existence of usage of a recognised and accessible grievance and dispute resolution mechanism for all stakeholders. Existence and usage of a mechanism which is accessible by all stakeholders. Stakeholders include but are not limited

to workers, contracted workers, local communities, indigenous and tribal people. Ensure that when dispute, grievances and conflicts arise, the operator acts appropriately to resolve them through negotiated agreement between parties based on Free, Prior and Informed Consent.

5.8.2 Percentage of projects involving multi stakeholders where agreement has been reached by consensus driven process based on Free, Prior and Informed Consent

7.2. Information transparency

SAFA (✓)

G.2.3.1. Transparency: (...) Real transparency involves understanding the information needs of stakeholders and making accurate, timely and relevant information available in an accessible way.

SAN (✓)

1.4 The objectives and a summary of the social and environmental management system and its programs must be available and made known to workers.

7.2 Critical Criterion. The farm management must implement policies and procedures for identifying and considering the interests of local populations and community interest groups regarding farm activities or changes that could have an impact on their health, employment or local natural resources. The farm must document and make available for public view all complaints and comments it receives related to its activities and its replies to them.

RSPO (✓)

1.1.1 There shall be evidence that growers and millers provide adequate information on (environmental, social and/or legal) issues relevant to RSPO Criteria to relevant stakeholders for effective participation in decision making.

1.1.2 (M) Records of requests for information and responses shall be maintained.

1.2.1 (M) Publicly available documents shall include, but are not necessarily limited to:

- Land titles/user rights
- Occupational health and safety plans
- Plans and impact assessments relating to environmental and social impacts

- HCV documentation
- Pollution prevention and reduction plans
- Details of complaints and grievances
- Negotiation procedures
- Continual improvement plans
- Public summary of certification assessment report
- Human Rights Policy

(Criterion 6.2 There are open and transparent methods for communication and consultation between growers and/or millers, local communities and other affected or interested parties)

6.2.1 (M) Consultation and communication procedures shall be documented.

6.2.2 A management official responsible for these issues shall be nominated.

6.2.3 A list of stakeholders, records of all communication, including confirmation of receipt and that efforts are made to ensure understanding by affected parties, and records of actions taken in response to input from stakeholders, shall be maintained

6.10.1 Current and past prices paid for Fresh Fruit Bunches (FFB) shall be publicly available.

6.10.2 (M) Evidence shall be available that growers/millers have explained FFB pricing, and pricing mechanisms for FFB and inputs/services shall be documented (where these are under the control of the mill or plantation).

6.10.3 Evidence shall be available that all parties understand the contractual agreements they enter into, and that contracts are fair, legal and transparent.

6.10.4 Agreed payments shall be made in a timely manner.

RTRS (~)

3.1.1 Documented evidence of communication channels and dialogue is available.

3.1.2 The channels adequately enable communication between the producer and the community.

3.1.3 The communication channels have been made known to the local communities.

Bonsucro (✓)

5.7.1 Percentage of greenfield expansion or new sugarcane project covered by ESIA. Cut-off date 1 January 2008. ESIA process shall start prior the formulation phase of a project, focus on significant issues and involve key stakeholders to identify them, provide information on possible alternative or appropriate mitigation measures for making decision based on free prior informed consent (FPIC) process, monitor and evaluate implemented measures. The operator shall involve independent third party experts.

CRITERION 5.8 To ensure active engagement and transparent, consultative and participatory processes with all relevant stakeholders

(No indicators)

8. Secure tenure of land

8.1. Compliance with the VGGT to secure land tenure and ownership

SAFA (✓)

G 4.4.2. Tenure Rights: In common with many governance indicators, this is primarily qualitative rather than quantitative, based on the degree of implementation of the Voluntary Guidelines on the Governance of Tenure (VGGT). Key principles include transparency, recording and valuing tenure and access rights, acting with due diligence to prevent infringing tenure rights, and co-operating to remedy any breach of these.

SAN (✓)

7.6 The farm must have a legitimate right to land use and tenure, demonstrated by presenting the appropriate official documentation. If there is no such documentation the farm must show either:

- a. The absence of significant disputes on land use, tenure and access, or;
- b. The consent of local communities, regarding the land, natural and agricultural resources.

RSPO (✓)

2.2.1 (M) Documents showing legal ownership or lease, history of land tenure and the actual legal use of the land shall be available.

2.2.2 Legal boundaries shall be clearly demarcated and visibly maintained.

2.2.3 Where there are or have been disputes, additional proof of legal acquisition of title and evidence that fair compensation has been made to previous owners and occupants shall be available, and that these have been accepted with free, prior and informed consent (FPIC).

2.2.4 (M) There shall be an absence of significant land conflict, unless requirements for acceptable conflict resolution processes (see Criteria 6.3 and 6.4) are implemented and accepted by the parties involved.

2.2.5 For any conflict or dispute over the land, the extent of the disputed area shall be mapped out in a participatory way with involvement of affected parties (including neighbouring communities where applicable).

2.2.6 (M) To avoid escalation of conflict, there shall be no evidence that palm oil operations have instigated violence in maintaining peace and order in their current and planned operations.

RTRS (✓)

1.2.1 There is documented evidence of rights to use the land (e.g. ownership document, rental agreement, court order etc.).

Bonsucro (✓)

1.2.1 The right to use land and water can be demonstrated

1.2.2 Land that is legitimately contested by other users

9. Employment and labour conditions**9.2. Full direct jobs equivalent in the biomass consuming region (or country)****SAFA (✓)**

C 4.1.1. Regional Workforce: Regional Workforce refers to the employees hired by the enterprise that come from the community, municipality or region where the enterprise operations are based. This indicator measures whether the enterprise

has hired during the last 5 years regional employees when similar skills, profile and conditions are offered in relation to other candidates to perform adequately the required duties and responsibilities.

SAN (✓)

5.3 The farm must directly hire its workforce, except when a contractor is able to provide specialized or temporary services under the same environmental, social and labour conditions required by this standard. The farm must not establish relations or contracts with third parties, form or directly participate in employee-owned companies, or use other mechanisms to avoid the direct hiring of workers and the obligations normally associated with labour contracts. Employment of foreign workers must be subject to a work permit issued by the competent government agency. The farm must not ask for money from workers in return for employment.

7.3 The farm must have policies and procedures for prioritizing the hiring and training of a local labour force and for contracting and acquiring local services and products.

RTRS (✓)

3.4.1 Employment opportunities are made known locally.

9.3. Human and Labour Rights

SAFA (✓)

S 1.1.1. Right to Quality of Life: This qualitative indicator ensures that all people involved work healthy hours without compulsory overtime.

S 2.2.1. Rights of Suppliers: This qualitative indicator measures whether buyers explicitly recognize and support in good faith primary producers and suppliers' rights to freedom of association and to collective bargaining for all contracts and agreements.

S 3.2.1 Forced Labour: This qualitative indicator intends to measure whether the enterprise employs people who are not free to quit or who cannot raise grievances without fear of retaliation

S 3.3.1. Child Labour: This qualitative indicator measures whether the enterprise, or its subsidiaries or sub-contractors, employ minor children - 16 years of age or younger - who are working full time or more, engaged in jobs that are dangerous

to them physically, mentally or morally, and who are deprived of the opportunity to live as children, to attend school and/or other appropriate training.

SAN (✓)

5.6 Working hours, rest periods during the workday, the number of annual paid vacation days, holidays, and rest days must comply with current labour laws and with the following minimum conditions:

- a. The maximum number of hours worked per week must not exceed 48.
- b. Workers must have a minimum of 24 consecutive hours rest (one day off) for every six consecutive days worked.
- c. All workers must have the right to annual paid vacation equivalent to a minimum of one day for each month worked (12 days or 2 work weeks per year) or the equivalent for part-time workers.

These rights and benefits must be made known to the workers and included in any labour contract or collective agreement.

5.7 All overtime must be voluntary. The farm must have policies and procedures relating to the requirements and assignation of overtime that conform to current labour laws (...)

5.8 Critical Criterion. It is prohibited to directly or indirectly employ full- or part-time workers under the age of 15 (...)

5.9 When applicable laws permit, minors between 12 and 14 years old may work part-time on family farms, only if they are family members or neighbours in a community where minors have traditionally helped with agricultural work (...)

5.10 Critical Criterion. Any type of forced labour is prohibited, including working under the regimen of imprisonment, in agreement with International Labour Organization (ILO) Conventions 29 and 105 and national labour laws (...).

5.12 Critical Criterion. Workers must have the right to freely organize and voluntarily negotiate their working conditions in a collective manner as established in ILO Conventions 87 and 98(...)

5.19 In those regions or countries where families traditionally harvest specific crops and where national laws do permit it, minors can participate in harvesting under the following conditions: (...)

RSPO (✓)

6.13.1 (M) A policy to respect human rights shall be documented and communicated to all levels of the workforce and operations

6.6.1 (M) A published statement in local languages recognising freedom of association shall be available.

6.9.1 (M) A policy to prevent sexual and all other forms of harassment and violence shall be implemented and communicated to all levels of the workforce.

6.9.2 (M) A policy to protect the reproductive rights of all, especially of women, shall be implemented and communicated to all levels of the workforce.

6.9.3 A specific grievance mechanism which respects anonymity and protects complainants where requested shall be established, implemented, and communicated to all levels of the workforce.

RTRS (✓)

2.2.2 Labour laws, union agreements or direct contracts of employment detailing payments and conditions of employment (e.g. working hours, deductions, overtime, sickness, holiday entitlement, maternity leave, reasons for dismissal, period of notice, etc.) are available in the languages understood by the workers or explained carefully to them by a manager or supervisor.

2.1 1 No forced, compulsory, bonded, trafficked or otherwise involuntary labour is used at any stage of production

2.1.2 No workers of any type are required to lodge their identity papers with anyone and no part of their salary, benefits or property is retained, by the owner or any 3rd party, unless permitted by law.

2.1.3 Spouses and children of contracted workers are not obliged to work on the farm.

2.1.4 Children and minors (below 18) do not conduct hazardous work or any work that jeopardizes their physical, mental or moral well being.

2.1.5 Children under 15 (or higher age as established in national law) do not carry out productive work. They may accompany their family to the field as long as they are not exposed to hazardous, unsafe or unhealthy situations and it does not interfere with their schooling

2.1.6 There is no engagement in, support for, or tolerance of any form of discrimination.

2.1.7 All workers receive equal remuneration for work of equal value, equal access to training and benefits and equal opportunities for promotion and for filling all available positions.

2.1.8 Workers are not subject to corporal punishment, mental or physical oppression or coercion, verbal or physical abuse, sexual harassment or any other kind of intimidation.

Bonsucro (✓)

(Criterion 2.1 To comply with ILO labour conventions governing child labour, forced labour, discrimination and freedom of association and the right to collective bargaining)

2.1.1 Minimum age of workers

2.1.2 Absence of forced or compulsory labour

2.1.3 Absence of discrimination

2.1.4 Respect the right of all workers to form and join trade unions and/ or to bargain collectively

9.4. Occupational safety and health for workers

SAFA (✓)

S 5.1.2. Safety of Workplace, Operations and Facilities: Employers are responsible for providing a safe and healthy workplace for all personnel and employees. This qualitative indicator measures whether the enterprise has been ensuring a safe, clean and healthy workplace for employees by determining if facilities and structures, equipment, practices, and food offered are safe and meet employee needs for healthy lifestyles.

S 5.1.1. Safety and Health Trainings: This qualitative indicator measures whether the enterprise has been providing training in health and safety for employees, and whether these trainings are effective.

S 5.1.3. Health Coverage and Access to Medical Care: This qualitative indicator measures whether the enterprise has been providing health coverage and ensuring emergency access to medical care for employees.

SAN (✓)

6.1 The farm must have an occupational health and safety program with the principal objective being to identify and minimize or eliminate workers' occupational risks.(...)

6.2 The farm must have a permanent and continuous training program to educate workers on how to carry out their work correctly and safely, especially regarding the handling of machinery and agricultural equipment (...)

6.6 The farm must provide workers in all work areas with the basic services, resources and working conditions necessary to comply with the occupational health and safety program objectives and with the safety, health, and cleanliness requirements of applicable laws and this standard. Farms must provide facilities for human hygiene purposes in all sites with worker presence that is out of reach of administrative infrastructure. The farm must consult workers about the provided services, resources and working conditions, and demonstrate that they take into account the results of these consultations. The farm must provide the necessary protective equipment, and require its usage, for all machinery, tools and other implements considered dangerous.

6.13 Critical Criterion. All workers that come into contact with agrochemicals, including those who clean or wash clothes or equipment that has been exposed to agrochemicals, must use personal protection equipment.

RSPO (✓)

The health and safety plan shall cover the following:

4.7.1 (M) A health and safety policy shall be in place. A health and safety plan covering all activities shall be documented and implemented, and its effectiveness monitored.

4.7.2 (M) All operations where health and safety is an issue shall be risk assessed, and procedures and actions shall be documented and implemented to address the identified issues. All precautions attached to products shall be properly observed and applied to the workers.

4.7.3 (M) All workers involved in the operation shall be adequately trained in safe working practices. Adequate and appropriate protective equipment shall be available to all workers at the place of work to cover all potentially hazardous operations, such as pesticide application, machine operations, and land preparation, harvesting and, if it is used, burning.

4.7.4 (M) The responsible person/persons shall be identified. There shall be records of regular meetings between the responsible person/s and workers. Concerns of all parties about health, safety and welfare shall be discussed at these meetings, and any issues raised shall be recorded.

4.7.5 Accident and emergency procedures shall exist and instructions shall be clearly understood by all workers. Accident procedures shall be available in the appropriate language of the workforce. Assigned operatives trained in First Aid should be present in both field and other operations, and first aid equipment shall be available at worksites. Records of all accidents shall be kept and periodically reviewed.

4.7.6 All workers shall be provided with medical care, and covered by accident insurance.

4.7.7 Occupational injuries shall be recorded using Lost Time Accident (LTA) metrics

RTRS (✓)

2.3.1 Producers and their employees demonstrate an awareness and understanding of health and safety matters.

2.3.2 Relevant health and safety risks are identified, procedures are developed to address these risks by employers, and these are monitored.

2.3.3 Potentially hazardous tasks are only carried out by capable and competent people who do not face specific health risks.

2.3.4 Adequate and appropriate protective equipment and clothing is provided and used in all potentially hazardous operations such as pesticide handling and application and mechanized or manual operations.

2.3.5 There is a system of warnings followed by legally-permitted sanctions for workers that do not apply safety requirements.

2.3.6 Accident and emergency procedures exist and instructions are clearly understood by all workers.

2.3.7 In case of accidents or illness, access to first aid and medical assistance is provided without delay.

Bonsucro (✓)

2.2.2. Main health and safety risks are assessed and measures for mitigation of risk are implemented

10. Health risks

10.1. Risks to public health

SAFA (✓)

S 5.2.1. Public Health: To ensure that operations and business activities do not limit the healthy and safe lifestyles of the local community by polluting or contaminating water, air and soils.

SAN (✓)

2.7 The farm must establish and maintain vegetation barriers between the crop and areas of human activity, as well as between production areas and on the edges of public or frequently travelled roads passing through or around the farm. These barriers must consist of permanent native vegetation with trees, bushes or other types of plants, in order to promote biodiversity, minimize any negative visual impacts and reduce the drift of agrochemicals, dust and other substances coming from agricultural or processing activities. The distance between the crop plants and areas of human activity as defined in Annex 1 must be respected

6.8. Workshops and storage facilities of all substances but agrochemicals or flammable must be designed, constructed and equipped to reduce the risk of accidents and negative impacts on human health and the environment. All of these areas must be used exclusively for designated purposes and must have signs inside and outside that indicate the types of substances stored, the dangers they present, and precautionary measures to be taken in the area. The design, construction and equipping of these facilities must comply with applicable laws or with the following parameters, whichever are stricter:

- a. The corridors and storage areas on the floor of the storage facilities must be well marked. There must be a free space of at least 30 centimetres between the wall and the stored materials.
- b. The storage facilities must have shelving and platforms for storing equipment made from non-absorbent materials for storing liquid products.
- c. There must be enough natural light to allow visibility during the day in the absence of electricity.
- d. There must be enough natural ventilation to prevent the accumulation of odours and vapours.
- e. The emergency exits must be clearly marked and unobstructed.

f. In the box and packaging assembly areas, the continuous noise level must not exceed 85 decibels.

g. The box and packaging assembly areas must have at least two meters of free space for each assigned worker.

h. The farm must have packing material (cardboard boxes, plastic and other materials) storage and assembly areas constructed from impermeable and non-flammable materials.

6.9. Those areas used for the storage and distribution of agrochemicals or flammable and toxic substances must be designed, constructed and equipped to reduce the risk of accidents and negative impacts on human health and the environment. These areas must be used exclusively for these purposes. Fuels and other flammable substances must not be stored with agrochemicals. All of these areas must have signs legible at a distance of 20 meters to indicate the types of substances stored, the dangers they present and precautionary measures to be taken in the area. The farm must ensure that all conditions comply with applicable laws or with the following parameters, whichever are stricter:

a. The floors and walls must be smooth and waterproof. In the agrochemical storage facilities, the floors must have a one percent slope and there must be a retention wall in the different entrances to prevent spilled liquids from escaping the storage area.

c. Fuel tanks and containers for flammable substances must be kept in enclosed areas with good ventilation, a retention wall and a smooth, waterproof floor to retain any spills. The walls' height must be calculated to retain 1.2 times the volume of the stored containers.

d. Fuel tank enclosures must have a system for removing spills and accumulated water from rain or washing. All drains in the storage areas must be connected to a collection and deactivation system and have an inspection box.

e. Underground fuel tanks must be eliminated.

f. Storage areas must have a loading area with collection system for spills.

g. The storage area must have enough capacity to hold the maximum amount of products needed for normal activities on the farm. Storage facilities must have an area to store empty containers.

h. The minimum height of agrochemical storage facilities must be three meters from the floor to the storage facility roof or ceiling.

- i. There must be enough natural light and the openings for permanent ventilation – windows, extractors and other permanent openings that allow air to circulate freely – must be a minimum of 20% of the total floor area.
- j. The corridors and storage areas on the floor of the storage facilities must be clearly marked. There must be a free space of at least 30 centimetres between the wall and the stored materials.
- k. The platforms or shelves must be well labelled, constructed from a non-absorbent material, and isolate the product from direct contact with the floor.
- l. There must not be any offices within the storage areas, except when the substances are completely separate from the office area and good ventilation is maintained.
- m. The farm must have designated areas for opening pesticide-treated bags (for the protection of fruit) designed to prevent the escape of these materials and to facilitate the collection of plastic wastes.
- n. Spill and airplane wash water contention and collection systems in airports used for fumigation services.

6.10. The farm must store agrochemicals in a manner that minimizes potential negative impacts on human health and on the environment. The farm must store only the amount of agrochemicals necessary to meet short-term needs. These products must be separated according to their biocide, toxicity and chemical formula. They must not be stored on the floor nor come within contact with absorbent materials. A Material Safety Data Sheet must be kept in the storage facility for each chemical product stored. All agrochemical containers must be washed three times before being stored for disposal or return to supplier. All agrochemical containers must maintain their original labels. The farm must take actions to return to the supplier agrochemicals that are prohibited, expired, or not legally registered, or agrochemicals that have had their licenses cancelled. If the supplier will not accept them, the farm must seek safe alternatives for eliminating them.

6.12. The farm must take permanent measures to reduce the risk of accidents or spills of agrochemicals during their transportation to and within the farm. Vehicles used for transporting chemicals must be in a good state of repair, legally registered and have insurance policies designed for these services. The persons in charge of transporting agrochemicals must demonstrate that they know how to safely transport and handle the substances. All agrochemicals must be transported to the farm in their original containers and accompanied by a copy of their Material Safety Data Sheet. The farm must only transport to the production

areas the quantity of agrochemicals necessary for that day's work. Chemicals must be transported in properly labelled plastic containers that are then returned to the storage facility after use. Mobile agrochemical application equipment must be transported empty to the application area.

6.15 The farm must take permanent actions to protect workers, neighbours and other persons from the effects of the application of agrochemicals and biological or organic inputs. The farm must identify the groups that are most exposed to applications and have mechanisms for alerting them well in advance regarding application dates and areas and the time periods during which entry to these areas is restricted. Access to these areas must be prevented by warning signs with symbols or by other safety indications. The farm must implement an application schedule in order to prevent undue entrance of unauthorized persons into the application area. The workers know and respect the restricted entry intervals, and quarantine and pre-harvest periods stipulated in the Material Safety Data Sheet for applying agrochemicals. For products that do not have restricted entry periods in the Material Safety Data Sheet, the following restricted entry intervals must be applied :(...)

When two products with different restricted entry or pre-harvest application intervals are used at the same time, the longest interval and the strictest quarantine procedures must be applied. Spray booms must have a coloured sign, visible from 30 meters, that corresponds to the toxicity of the product being applied or to that of the most toxic product in the application mix.

RSPO (✓)

5.5.4 The necessary precautions are taken to avoid people entering into recently sprayed areas

5.9.5 There is no application of pesticides within 30m of any populated areas or water bodies.

RTRS (✓)

5.5.4 The necessary precautions are taken to avoid people entering into recently sprayed areas

(Criterion 5.9 Appropriate measures are implemented to prevent the drift of agrochemicals to neighboring areas)

5.9.1 There are documented procedures in place that specify good agricultural practices, including minimization of drift, in applying agrochemicals and these procedures are being implemented.

5.9.2 Records of weather conditions (wind speed and direction, temperature and relative humidity) during spraying operations are maintained.

5.9.3 Aerial application of pesticides is carried out in such a way that it does not have an impact on populated areas. All aerial application is preceded by advance notification to residents within 500m of the planned application.

5.9.4 There is no aerial application of pesticides in WHO Class Ia, Ib and II within 500m of populated areas or water bodies.

5.9.5 There is no application of pesticides within 30m of any populated areas or water bodies.

CAP (~)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Public health, animal health and plant health. Food safety

12. Production costs

12.1. Levelised life-cycle cost, excluding subsidies (including CAPEX, OPEX)

SAFA (✓)

G 5.2.1. Full-Cost Accounting: The full-cost accounting process makes transparent both direct and indirect subsidies received, as well as direct and indirect costs. Because there is, as yet, no universal FCA standard, this indicator cannot be usefully metricized for the purposes of external comparison.

C1.4.2. Cost of Production: The cost of production is an economic or accounting indicator that refers to the costs incurred by the enterprise during a given time period to acquire and transform direct materials, so as to produce and sell revenue generating products, goods and/or services.

1.3. Bioenergy schemes

In Table 3 the benchmark and gap analysis of the selected Bioenergy schemes against the (draft) S2Biom indicators is shown.

Table 3 Benchmark and Gap Analysis of the selected Bioenergy Schemes against the (draft) S2Biom Indicators

Theme	Criteria	#	S2Biom Indicator	GBEP	RED	RSB	SBP	RSPO	RTRS	Bonsucro	Greenenergy	ISCC-EU	GGL-Agri	GGL-Forest
ENVIRONMENTAL	1. Resource efficiency	1.1	Land use efficiency											
		1.2	Secondary resource efficiency											
		1.3	Energy efficiency	✓	~			✓		✓			✓	✓
		1.4	Functionality (output service quality)											
	2. Climate change	2.1	Life cycle GHG emissions (CO ₂ eq) including direct LUC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		2.2	Other GHG emissions				✓							
	3. Biodiversity	3.1	Protected areas and land with significant biodiversity values	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Theme	Criteria	#	S2Biom Indicator	GBEP	RED	RSB	SBP	RSPO	RTRS	Bonsucro	Greenery	ISCC-EU	GGL-Agri	GGL-Forest
		3.2	Biodiversity conservation and management	✓	~	✓	✓	✓	✓	✓	✓	✓		✓
	4. Soil	4.1	Erosion	✓	~	✓	~	✓	✓	~	✓	✓	✓	✓
		4.2	Soil Organic Carbon	✓	~	✓	✓	✓	✓	~	✓	✓	✓	~
		4.3	Soil nutrient balance	✓		✓	✓	✓	✓	~	✓	✓	✓	~
	5. Water	5.1	Water availability and regional water stress	✓	~	✓	✓	✓	✓		~	✓	✓	
		5.2	Water use efficiency	✓	~	✓		✓		✓	✓	✓	✓	
		5.3	Water quality	✓	~	✓	~	✓	✓	✓	✓	✓	✓	
	6. Air	6.1	SO2 equivalents	✓		✓	~	✓		✓	~			
		6.2	PM10	✓		✓	~	✓		✓	~			
	SOCIAL	7. Participation and transparency	7.1	Effective participatory process	~		✓		✓	~	✓	✓	~	✓
7.2			Information transparency	~		✓		✓	~	✓	~	~		

Theme	Criteria	#	S2Biom Indicator	GBEP	RED	RSB	SBP	RSPO	RTRS	Bonsucro	Greenenergy	ISCC-EU	GGL-Agri	GGL-Forest	
	8. Secure tenure of land	8.1	Compliance with the VGGT to secure land tenure and ownership	✓		✓	✓	✓	✓	✓	✓	✓		✓	
	9. Employment and labour conditions	9.1	Full direct job equivalents along the full value chain	✓								~			
		9.2	Full direct job equivalents in the biomass consuming region (or country)	✓		✓	✓		✓						
		9.3	Human and labour rights			✓	✓	✓	✓	✓	✓	✓	✓		
		9.4	Occupational safety and health for workers	✓		✓	✓	✓	✓	✓	✓	✓	✓		
	10. Health Risks	10.1	Risks to public health	✓	~	✓			✓			✓			

Theme	Criteria	#	S2Biom Indicator	GBEP	RED	RSB	SBP	RSPO	RTRS	Bonsucro	Greenenergy	ISCC-EU	GGL-Agri	GGL-Forest
	11. Food security	11.1	Risks for negative impacts on price and supply of national food basket and fuelwood.	✓		~	✓					✓	✓	
ECONOMIC	12. Production costs	12.1	Levelised life-cycle cost, excluding subsidies (including CAPEX, OPEX)	✓										

1. Resource efficiency

1.3. Energy Efficiency

GBEP (✓)

Net energy balance: Energy ratio of the bioenergy value chain with comparison with other energy sources, including energy ratios of feedstock production, processing of feedstock into bioenergy, bioenergy use; and/or lifecycle analysis

RED (~)

(EU) No 1305/2013

(5) promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors, with a focus on the following areas:

(b) increasing efficiency in energy use in agriculture and food processing;

SBP (✓)

Standard #5: Collection of Data for Energy and Carbon Balance Calculations

Version 0.0

The Biomass Producer will not be responsible for calculating the GHG emissions of the supply chain or for the accurate use of default or reference numbers, but must provide all necessary data to facilitate those calculations.

This is because GHG/Energy methodology currently differs per country (SBP 2014)

RSPO RED(✓)

5.4.1 A plan for improving efficiency of the use of fossil fuels and to optimise renewable energy shall be in place and monitored.

Bonsucro EU (✓)

(Criterion 5.4 To promote energy efficiency)

5.4.1 Total Net Primary Energy Usage per kg product

5.4.2 Energy used in cane transport per ton cane transported

5.4.3 Primary energy use per ton of sugarcane

GGL-Agri (✓)

GGLS8 – Greenhouse Gasses and Energy Balance Calculation Standard

GGL-Forest (✓)

GGLS8 – Greenhouse Gasses and Energy Balance Calculation Standard

2. Climate Change**2.1. Life cycle GHG emissions (CO₂eq), including direct LUC****GBEP (✓)**

1. Lifecycle GHG emissions

RED (✓)

DIRECTIVE 2009/28/EC. Article 17.

2.The greenhouse gas emission saving from the use of biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall be at least 35 %.

With effect from 1 January 2017, the greenhouse gas emission saving from the use of biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall be at least 50 %. From 1 January 2018 that greenhouse gas emission saving shall be at least 60 % for biofuels and bioliquids produced in installations in which production started on or after 1 January 2017.

The greenhouse gas emission saving from the use of biofuels and bioliquids shall be calculated in accordance with Article 19(1).

In the case of biofuels and bioliquids produced by installations that were in operation on 23 January 2008, the first subparagraph shall apply from 1 April 2013.

RSB (GLOBAL) (✓)

(Criterion 3b. Lifecycle GHG emissions of biofuel shall be calculated using the RSB lifecycle GHG emission calculation methodology, which incorporates methodological elements and input data from authoritative sources; is based on sound and accepted science; is updated periodically as new data become available; has system boundaries from Well to Wheel; includes GHG emissions

from land use change, including, but not limited to above- and below-ground carbon stock changes; and incentivizes the use of co-products, residues and waste in such a way that the lifecycle GHG emissions of the biofuel are reduced)

3.b.i.1. The participating operator has either (a) conducted all required calculations using the RSB GHG calculation methodology or (b) used the RSB-listed methodology that is applicable to her/his/its biomass/biofuels operation(s), or (c) provided all necessary input data to the external party that performs the GHG emissions calculations.

3.c.i.1. For biofuel substitutes of gasoline, diesel, and aviation jet fuel, the lifecycle GHG emissions of biofuel blends, in gCO₂e/MJ-fuel, are on average lower than the gasoline, diesel, and jet fuel baseline by 50%. Note: A biofuels blend can be comprised 100% of the same biofuel.

SBP (✓)

Standard #5: Collection of Data for Energy and Carbon Balance Calculations

Version 0.0

The Biomass Producer will not be responsible for calculating the GHG emissions of the supply chain or for the accurate use of default or reference numbers, but must provide all necessary data to facilitate those calculations.

This is because GHG/Energy methodology currently differs per country (SBP 2014)

RSPO RED(✓)

5.6.2 (M) Significant pollutants and greenhouse gas (GHG) emissions shall be identified, and plans to reduce or minimise them implemented.

7.8.1 (M) The carbon stock of the proposed development area and major potential sources of emissions that may result directly from the development shall be identified and estimated.

7.8.2 There shall be a plan to minimise net GHG emissions which takes into account avoidance of land areas with high carbon stocks and/or sequestration options.

R2(v) Greenhouse gas criterion. One of the following options must be used to for the EU-RED greenhouse gas criterion:

(a) Use of a default value specified in Annex V of EU-RED, which complies with the 35% greenhouse gas reduction criterion specified in EU-RED (and the 50% greenhouse gas reduction criterion from 1 January 2017).

For palm oil biodiesel and hydrotreated vegetable oil from palm oil, currently only default values assuming methane capture at palm oil mills comply with the 35% greenhouse gas reduction criterion (and 50% from 1 January 2017). In Annex V of EU-RED, the aggregated default value for cultivation, processing (including methane capture at palm oil mill), transport and distribution of palm oil biodiesel is set at 37 g CO₂eq/MJ (equivalent to an actual greenhouse gas saving of 56%). The aggregated default value for cultivation, processing (including methane capture at palm oil mill), transport and distribution of hydrotreated vegetable oil is set at 29 g CO₂eq/MJ (equivalent to an actual greenhouse gas emission saving of 65%).

In order to use these default values, there shall be evidence that biogas capture from palm oil mill effluent (POME) is applied.

Indicators related to a):

- There shall be evidence that methane (biogas) capture from palm oil mill effluent (POME) is used.
- Supply chain operators shall clearly communicate to the next economic operator that the default value option is being applied for the EU-RED greenhouse gas criterion. The relevant default value (g CO₂eq/MJ) shall also be communicated to the next economic operator.

(b) Use of actual greenhouse gas values to calculate total greenhouse gas savings according to the EU-RED methodology.

Indicators related to b):

- Producers shall use an EC approved greenhouse gas methodology. The overview of EC approved methodologies can be found on:

http://ec.europa.eu/energy/renewables/biofuels/sustainability_schemes_en.htm

- Supply chain operators shall clearly communicate to the next economic operator which calculation methodology is being applied. Disaggregated (actual and default) greenhouse gas data shall be communicated to the next economic operator.
- Records of greenhouse gas data and calculations shall be kept for 5 years.

(c) Until 31 March 2013, palm oil can be claimed to be in compliance with the EU-RED greenhouse gas criterion if there is evidence that the palm oil mill was in operation on or before 23 January 2008 (this is the grandfathering option). From 1 April 2013 no scheme-compliant claim can be made without meeting the EU-RED greenhouse gas threshold, regardless of when the palm oil was processed. Indicators related to c):

- In order to use the grandfathering clause by producers, there shall be evidence that the palm oil mill was in operation on or before 23 January 2008.

- Supply chain operators shall clearly communicate to the next economic operator that the grandfathering clause is being applied for the EU-RED greenhouse gas criterion.

RTRS EU RED (✓)

(Criterion 4.3 Efforts are made to reduce emissions and increase sequestration of Greenhouse Gases (GHGs) on the farm)

Requirements

1. Greenhouse Gas (GHG) emissions on the farm

1.1 Greenhouse gas (GHG) emissions from soy cultivation are measured and recorded

Option 1 – Default value

1.1.1 Farmers may use a default value of 19 g CO₂eq/MJ soy biodiesel for cultivation. However, use of default values may preclude the end product from meeting the minimum 35% GHG savings as required in the EU RED (see guidance).

Option 2 – Calculations

1.1.2 Yield data is measured, monitored and recorded over the growing year. The moisture content of the crop yield is measured and recorded.

1.1.3 Electricity consumption is measured, monitored and recorded over the growing year.

1.1.4 Fertiliser use is measured, monitored and recorded over the growing year (see RTRS Standard for Responsible Soy Production Version 1.0, 5.5.1)

1.1.5 Pesticide use is measured, monitored and recorded over the growing year (see RTRS Standard for Responsible Soy Production Version 1.0, 5.5.1)

1.1.6 Soybeans used for planting are measured, monitored and recorded over the growing year.

1.1.7 Fuel use is measured, monitored and recorded over the growing year (see also RTRS Standard for Responsible Soy Production Version 1.0, 4.3.1).

1.1.8 GHG emissions from cultivation are calculated.

Note: This calculation can be made using an RTRS approved on-line GHG-emissions calculator

1.2 Greenhouse gas (GHG) emissions from land use are calculated and recorded

1.2.1 Where expansion has occurred after January 2008 the carbon content per unit area of soil and vegetation before conversion into annual cropland land is recorded.

1.2.2 Where expansion has occurred after January 2008 the carbon content per unit area of soil and vegetation after conversion into annual cropland is recorded (see also RTRS Standard for Responsible Soy Production Version 1.0, 4.3.3 and 5.3.3).

1.2.3 Where expansion occurs on highly degraded or highly contaminated land, the following shall apply:

a) There is a reduction in soil contamination which is measured, monitored and recorded,

b) There is a continuous increase in the carbon stock and a reduction in erosion which is measured and recorded (see also RTRS Standard for Responsible Soy Production Version 1.0, 4.3.3 and 5.3.3),

c) There is evidence that the area was not being used for agricultural purposes in January 2008.

1.2.4 Changes in the carbon content per unit area as a result of soil accumulation via improved agricultural management are measured and recorded (see also RTRS Standard for Responsible Soy Production Version 1.0, 4.3.3 and 5.3.3).

1.2.5 GHG emissions from land use change, highly degraded or contaminated land and accumulation via improved agricultural management are calculated.

1.3 Greenhouse gas (GHG) emissions from transport of soybeans are calculated and recorded

This requirement is applicable only if a farmer has control of the transport of soybeans from the farm to the next economic operators (e.g. between production area and grain silo or crush).

Option 1 – Default value

1.3.1 Farmers may use a default value of 13 g CO₂eq/MJ soy biodiesel for transportation. However, use of the default value will prevent the use of actual values for transportation in the supply chain and may preclude the end product from meeting the minimum 35% GHG savings as required in the EU RED (see guidance).

Option 2 – Calculations

1.3.2 Where transportation to the next economic operator is under the control of the farmer the following is measured and recorded:

- a) the distance between the farmer and the next economic operator,
- b) the type of transport used to transport the crop,
- c) the quantity of soybean transported,
- d) the moisture content of the transported crop

1.3.3 GHG emissions from transportation are calculated.

Note: This calculation can be made using an RTRS approved on-line GHG-emissions calculator

1.4 Greenhouse gas (GHG) emissions are calculated and communicated to the next economic operator in the supply chain.

1.4.1 The GHG emissions are communicated to the next economic operator in the supply chain including:

- a) Soy cultivation
- b) Soy land use change (where applicable)
- c) Degraded land bonus (where applicable)
- d) Transportation (where applicable)

1.4.2 Records of GHG data and calculations are kept for at least 5 years.

Bonsucro EU (✓)

3.2.1 Net GHG emissions per ton of cane

3.2.2 Net GHG emissions per ton of sugar

3.2.3 Net GHG emissions per MJ of ethanol

6.1.1 Global warming burden per unit of energy.

Greenergy (✓)

I.1.1.1 Evidence that biomass production has not caused direct land use change, on or after 1 January 2008, which results in GHG emissions not meeting the minimum threshold for greenhouse gas savings.

ISCC-EU (✓)

See mandatory requirements in the document "ISCC-EU 205 GHG Emissions Calculation Methodology and GHG Audit"

GGL-Agri (✓)

GGLS8 – Greenhouse Gasses and Energy Balance Calculation Standard

GGL-Forest (✓)

GGLS8 – Greenhouse Gasses and Energy Balance Calculation Standard

2.2. Other GHG emissions

SBP (✓)

2.9 Criterion: Carbon stocks are maintained or increased.

2.9.1: Biomass is not be sourced from areas that had high carbon stocks in January 2008 and no longer have those high carbon stocks.

2.9.2: Analysis demonstrates that feedstock harvesting does not diminish the capability of the forest to act as an effective sink or store of carbon over the long term.

3. Biodiversity

3.1. Protected areas and land with significant biodiversity values

GBEP (✓)

7. Biological diversity in the landscape

(- Area and percentage of nationally recognized areas of high biodiversity value or critical ecosystems converted to bioenergy production

- Area and percentage of the land used for bioenergy production where nationally recognized invasive species, by risk category, are cultivated

- Area and percentage of the land used for bioenergy production where nationally recognized conservation methods are used)

RED (✓)

DIRECTIVE 2009/28/EC. Article 17.

3. Biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall not be made from raw material obtained from land with high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have that status:

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

(b) areas designated:

(i) by law or by the relevant competent authority for nature protection purposes;
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 second subparagraph of Article 18(4);

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

(c) highly biodiverse grassland that is:

(i) natural, namely grassland that would remain grassland in the absence of human intervention and which 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 which is species-rich and not degraded,

unless evidence is provided that the harvesting of the raw material is necessary to preserve its grassland status.

The Commission shall establish the criteria and geographic ranges to determine which grassland shall be covered by point (c) of the first subparagraph. Those measures, designed to amend non-essential elements of this Directive, by supplementing it shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 25(4).

4. Biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall not be made from raw material obtained from land with high carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status:

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

(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, unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology laid down in part C of Annex V is applied, the conditions laid down in paragraph 2 of this Article would be fulfilled.

The provisions of this paragraph shall not apply if, at the time the raw material was obtained, the land had the same status as it had in January 2008.

5. Biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.

RSB (GLOBAL) (✓)

7.a.i.4. The participating operator provides objective evidence demonstrating that no area with conservation values of global, regional or local importance has been converted for biofuels production after 1 January 2009, or earlier as prescribed by other international standards.

7.a.i.7. The participating operator provides objective evidence demonstrating that the results of the RSB Screening Exercise (RSBGUI- 01-002-02) and related precautionary measures have been effective in giving preference to operating in areas which pose the lowest risk to conservation values of global, regional or local importance.

7.a.i.9. The participating operator provides objective evidence demonstrating that none of her/his/its biomass/biofuel operation(s) have taken place or are planned within legally protected areas, UNESCO World Heritage sites, Ramsar sites, IUCN Protected Areas Types 1 & 2, Alliance for Zero Extinction sites, or any legally protected areas, after 1 January 2009 unless there is documented evidence that biomass/biofuels production or processing operation(s) are legally authorized as part of the conservation management for the area concerned.

7.b.i.2. If evidence exists that the operation will directly affect ecosystem functions and services, the participating operator provides objective evidence demonstrating that management of her/his/its biomass/biofuels operation(s) effectively maintains or enhances the ecosystem functions and services identified both inside, and outside the site(s) of the biomass/biofuels operation(s).

SBP (✓)

2.1.1. The Biomass Producer (BP) has control systems and procedures for verifying that forests and other areas with high conservation values are identified and mapped.

2.2.3. The BP has control systems and procedures to ensure that there are key ecosystems and habitats which are conserved or set aside in their natural state (CPET S8b).

2.9.1. Biomass is not be sourced from areas that had high carbon stocks in January 2008 and no longer have those high carbon stocks.

RSPO RED(✓)

5.2.1 (M) Information shall be collated in a High Conservation Value (HCV) assessment that includes both the planted area itself and relevant wider landscape-level considerations (such as wildlife corridors).

7.3.1 (M) There shall be evidence that no new plantings have replaced primary forest, or any area required to maintain or enhance one or more High Conservation Values (HCVs), since November 2005. New plantings shall be planned and managed to best ensure the HCVs identified are maintained and/or enhanced (see Criterion 5.2).

7.3.2 (M) A comprehensive HCV assessment, including stakeholder consultation, shall be conducted prior to any conversion or new planting. This shall include a land use change analysis to determine changes to the vegetation since November 2005. This analysis shall be used, with proxies, to indicate changes to HCV status.

7.3.3 Dates of land preparation and commencement shall be recorded.

7.3.4 (M) An action plan shall be developed that describes operational actions consequent to the findings of the HCV assessment, and that references the grower's relevant operational procedures (see Criterion 5.2).

7.3.5 Areas required by affected communities to meet their basic needs, taking into account potential positive and negative changes in livelihood resulting from proposed operations, shall be identified in consultation with the communities and incorporated into HCV assessments and management plans (see Criterion 5.2).

R1 Producers whose land was under oil palm cultivation in January 2008, and who wish to comply with sustainability standards in the EU Renewable Energy Directive shall meet the following requirements in addition to the existing guidance under the RSPO Principles & Criteria:

R1.1 There is evidence that the land was under palm oil production in January 2008.

R1.2: There is evidence that the land is not designated for nature protection purposes by law or by the relevant competent authority. There is evidence that the land is not designated 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 the recognition of these organisations as outlined in Article 18(4) of the EU-RED. R1.2 Indicators:

- Records indicating the status of the land in January 2008 shall be kept.

R1.3 There is evidence that the land was not a wetland in January 2008. In case the land was a wetland in January 2008, there is evidence that the production of palm oil has not changed the nature and the status of the wetlands. R1.3 Indicators:

- Records indicating the land status in January 2008 shall be kept.

- In case the land was a wetland, records of drainage depth shall be kept.

R1.4: There is evidence that the land was not a peatland in January 2008. In case the land was a peatland, there is evidence that the production of palm oil does not involve drainage of previously undrained soil. This means that for peatland that was partially drained in January 2008 a subsequent deeper drainage, affecting soil that was not already fully drained, would constitute a breach of the criterion. R1.4 Indicators:

- Records indicating the status of the land in January 2008 shall be kept.
- For peatlands, there shall be evidence that the production of palm oil does not involve drainage of previously undrained soil. Such evidence shall comprise of detailed drainage profiles/maps indicating drainage depth across the land considered, before and during oil palm cultivation.
- Records of drainage depth shall be kept.

RTRS EU RED (✓)

(Criterion 4.4 Expansion of soy cultivation is responsible)

Note: This criterion will be revised after June 2012 if RTRS-approved maps and system are not available.

4.4.1 After May 2009 expansion for soy cultivation has not taken place on land cleared of native habitat except under the following conditions:

4.4.1.1 It is in line with an RTRS-approved map and system (see Annex 4.)

or

4.4.1.2 Where no RTRS-approved map and system is available:

a) Any area already cleared for agriculture or pasture before May 2009 and used for agriculture or pasture within the past 12 years can be used for soy expansion, unless regenerated vegetation has reached the definition of native forest (see glossary).

b) There is no expansion in native forests (see glossary)

c) In areas that are not native forest (see glossary), expansion into native habitat only occurs according to one of the following two options:

Option 1. Official land-use maps such as ecological-economic zoning are used and expansion only occurs in areas designated for expansion by the zoning. If there are no official land use maps then maps produced by the government under the Convention on Biological Diversity (CBD) are used, and expansion only occurs outside priority areas for conservation shown on these maps.

Option 2. An High Conservation Value Area (HCVA) assessment is undertaken prior to clearing and there is no conversion of High Conservation Value Areas.

Note: Where neither official land use maps nor CBD maps exist, Option 2 must be followed.

4.4.2 There is no conversion of land where there is an unresolved land use claim by traditional land users under litigation, without the agreement of both parties.

REQUIREMENTS:

2. Land Use

2.1 There is no conversion of high biodiversity areas

2.1.1 There is evidence to confirm in January 2008, the land currently under soy cultivation did not have any of the following statuses:

- primary forest
- grassland
- designation for nature protection purposes, unless evidence is provided that soy cultivation did not interfere with those nature protection purposes.
- designation for the protection of rare, threatened or endangered ecosystems or species recognised by the European Commission, unless evidence is provided that soy cultivation did not interfere with those nature protection purposes.

2.2 There is no conversion of high carbon areas

2.2.1 There is evidence that no conversion of high carbon stock areas has occurred since January 2008. Land with high carbon stock status is:

- Land that is covered with or saturated by water permanently or for a significant part of the year.
- Peatland
- Continuously forested areas
- Land spanning more than one hectare with trees higher than five meters and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds in situ, unless evidence is provided that the GHG emissions for the whole supply chain meet the 35% savings threshold.

2.2.2 For land defined as peatland according to its soil type, that was partially drained in January 2008, a subsequent deeper drainage, affecting soil that was not already fully drained, would constitute a breach of the criterion.

2.2.3 For land defined as wetland according to its hydrological status, no drainage occurred since January 2008 that led to losing this status.⁴

2.3 Land use information is communicated to the next economic operator in the supply chain.

2.3.1 The status of the land in January 2008 is communicated to the next economic operator.

2.3.2 Records of land use status since January 2008 are kept.

Bonsucro EU (✓)

4.1.2 Percentage of areas defined internationally as legally protected or classified as of High Conservation Value planted to sugarcane after the cut-off date of 1 January 2008

5.7.1 Percentage of greenfield expansion or new sugarcane project covered by ESIA

6.1.2 Percentage of land with high biodiversity value, high carbon stock or peatlands planted to sugarcane after the cut-off date of 1 January 2008.

Greenergy (✓)

I.1.1.2 Evidence that biomass production has not caused direct land use change of wetlands on or after 1 January 2008.

I.1.1.3 Evidence that biomass production has not caused direct land use change of peatlands on or after 1 January 2008

I.1.1.4 Evidence that biomass production has not caused direct land use change of continuously forested areas on or after 1 January 2008.

I2.2.1 Evidence that biomass production has not caused direct land use change of primary forest and other wooded land on or after 1 January 2008.

I2.2.2 Evidence that biomass production has not caused direct land use change of grassland on or after 1 January 2008.

I2.2.3 Evidence that production does not take place in areas serving purposes of nature protection which are areas that have been designated, by law or by the competent authority, for purposes of nature protection.

I2.2.4 Evidence that production does not take place in high conservation value areas.

I2.3.1 Documentation of the status of rare, threatened or endangered species and high conservation value habitats in and around the production site.

ISCC-EU (✓)

Criterion 1.1 Biomass is not produced on land with high biodiversity value. The production on land that had one of the following statuses in or after January 2008, no matter whether or not the land still has this status is not allowed:

(1) Forest land

(2) Areas designated by law or by the relevant competent authority to serve the purpose of nature protection

(3) Areas for the protection of rare, threatened or endangered ecosystems or species

1.2 Biomass is not produced on highly biodiverse grassland

1.3 Biomass is not produced on land with high carbon stock

This means land that used to have one of the following statuses in January 2008 or thereafter and no longer had this status at the time of growing and harvesting biomass:

(1) Wetlands

(2) Forested areas

1.4 Biomass is not produced on land that was peatland in January 2008 or thereafter (Article 17(5) of the Directive 2009/28/EC)

1.5 Reference date. If areas have been converted after January 2008, the conversion and use must be in accordance with the requirements of principle 1.

GGL-Agri (✓)

Principle 7 Raw materials shall not be obtained from land with high biodiversity value

GGL-Forest (✓)

Principle 7 Raw materials shall not be obtained from land with high biodiversity value.

3.2. Biodiversity conservation and management

GBEP (✓)

7. Biological diversity in the landscape

RED (~)

(EU) No 1307/2013. Chapter 3, Article 44 (1-5). Agricultural practices beneficial for the climate and the environment: Crop diversification.

(EU) No 1307/2013. Chapter 3, Article 46 (1-9). Agricultural practices beneficial for the climate and the environment: Having Ecological Focus Area (EFAs) on the agricultural area.

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Environment, climate change, good agricultural condition of land: Biodiversity

RSB (GLOBAL) (✓)

7.a.i.6. The participating operator provides objective evidence demonstrating that precautionary measures and implemented practices have been effective in maintaining or enhancing conservation values of global, regional or local importance.

Guidance for 7.a.i.6: The mitigation measures to be covered in the ESMP include but are not limited to sustainable harvesting of the biomass existing on the site (e.g. thinning, mowing), protection measures for biodiversity values, the creation of conservation set side zones, buffer zones, multiple use zones, controls on access and product removals, and specifically the ban on hunting, fishing, ensnaring, poisoning and exploitation of rare, threatened, endangered and legally protected species.

7.b.i.2. If evidence exists that the operation will directly affect ecosystem functions and services, the participating operator provides objective evidence demonstrating that management of her/his/its biomass/biofuels operation(s) effectively maintains or enhances the ecosystem functions and services identified both inside, and outside the site(s) of the biomass/biofuels operation(s).

Guidance: The management practices in the ESMP may include:

For ecosystem functions: the creation or maintenance and protection of areas where natural regeneration processes are allowed to take place, and where populations of native plants and animals can breed, feed and find refuge.

For Ecosystem services:

- Actions to control and minimize disturbance to water quality and water flows e.g. the creation or protection of riparian buffer zones of natural vegetation, and the maintenance of natural vegetation in important water catchments, especially steep slopes.
- Actions to control and minimize soil disturbance, erosion and compaction including the avoidance of land clearance on sensitive or highly erodible soils, especially on steep slopes, and positive soil restoration measures where appropriate.
- Actions to minimize the risk of fire and the effects of wind erosion e.g. maintenance of appropriate natural barriers.
- Protection and maintenance of areas of natural vegetation where local populations can maintain a sustainable harvest of those natural goods (e.g. NTFPs) which have been identified as important to their livelihoods.

11.b.i.1. The participating operator provides objective evidence demonstrating that a risk assessment in relation to the use of technologies, including GMOs, has been conducted prior to certification, which:

- identifies all technologies of her/his/its operation(s) which actually or potentially pose a social, environmental and/or economic risk to stakeholders, communities, industries, society at large and the environment;
- identifies all impacts which these identified technologies actually and potentially have on stakeholders, communities, industries, society at large and the environment;
- demonstrates the social and environmental benefits brought by these identified technologies compared to the other alternatives;

7.e.i.1. The participating operator provides objective evidence demonstrating that no species which is officially prohibited at national or regional level because of high risk for invasion or which has been analysed or recorded (e.g. in the Global Invasive Species Database) as highly invasive under similar conditions (climate, local ecosystems, soil types, etc.) are used by the biomass/biofuels operation(s) of the participating operator.

- identifies measures to avoid and/or mitigate actual and potentially negative impacts of these identified technologies of her/his/its operation(s) on stakeholders, communities, industries, society at large and the environment; and

- identifies measures to systematically monitor these identified factors and aspects of the biomass/biofuels operation(s), their actual and potential impacts, as well as the measures identified and implemented to avoid or mitigate associated risks and impacts, and the effectiveness of these measures.

11.b.i.2. The identified measures (11.b.i.1.) to avoid and/or mitigate negative impacts of the technologies use in biomass/biofuel operation(s) on stakeholders, communities, industries, society at large and the environment are implemented.

11.b.i.3. The participating operator provides objective evidence demonstrating that any use of technologies identified as potentially hazardous for people or the environment is used in compliance with national laws and internationally accepted scientific protocols and does not contradict any of the RSB Principles and Criteria.

11.b.i.4. When using Genetically Modified Organisms, the participating operator provides objective evidence demonstrating that such use follows national or international guidelines, laws and agreements, crop-specific stewardship systems, and local and community coexistence agreements or understandings.

11.b.i.5. If Genetically Modified Organisms are used, the Operator has implemented measures to prevent migration of genetically modified material outside of the operation site.

11.b.i.6. If Genetically Modified Organisms are used, the participating operator provides objective evidence demonstrating cooperation with neighbours, regulatory and conservation authorities, and local stakeholders in the monitoring of the impacts of GMOs and measures to prevent negative impacts on stakeholders, communities, industries, society at large and the environment.

11.b.i.7. If Genetically Modified Organisms are used, the participating operator provides objective evidence demonstrating that the Biosafety Clearinghouse established under the Cartagena Protocol on Biosafety has been consulted to identify country specific laws, decisions and declarations that apply to the GMOs in use by the participating operator.

11.b.i.8. Operators using non-native crops have documented evidence indicating that an equivalent native crop could not provide the same function with higher yield and/or environmental and/or social performance.

11.d.i.6. The participating operator provides objective evidence that chemicals are disposed, recycled or destroyed in a manner that minimizes the risk of accidents and potential negative impacts on human health and on the environment.

11.d.i.7. The participating operator provides objective evidence that measures are in place to reduce the risk of accidents or spills during transportation of chemicals to and within the operations and applicable health, environmental and safety precautions are implemented. (e.g., safely transported using appropriate equipment).

SBP (✓)

1.5.1. The BP has control systems and procedures to verify that feedstock is supplied in compliance with the requirements of CITES.

2.2.4. The BP has control systems and procedures to ensure that biodiversity is protected (CPET S5b).

2.10.1 Genetically modified trees are not used.

RSPO RED(✓)

(Criterion 4.5. Pests, diseases, weeds and invasive introduced species are effectively managed using appropriate Integrated Pest Management techniques)

5.2.1 (M) Information shall be collated in a High Conservation Value (HCV) assessment that includes both the planted area itself and relevant wider landscape-level considerations (such as wildlife corridors).

5.2.2 (M) Where rare, threatened or endangered (RTE) species, or HCVs, are present or are affected by plantation or mill operations, appropriate measures that are expected to maintain and/or enhance them shall be implemented through a management plan.

5.2.3 There shall be a programme to regularly educate the workforce about the status of these RTE species, and appropriate disciplinary measures shall be instigated in accordance with company rules and national law if any individual working for the company is found to capture, harm, collect or kill these species.

5.2.4 Where a management plan has been created there shall be ongoing monitoring:

- The status of HCV and RTE species that are affected by plantation or mill operations shall be documented and reported;
- Outcomes of monitoring shall be fed back into the management plan.

5.2.5 Where HCV set-asides with existing rights of local communities have been identified, there shall be evidence of a negotiated agreement that optimally safeguards both the HCVs and these rights.

RTRS EU RED (✓)

(Criterion 4.5 On-farm biodiversity is maintained and safeguarded through the preservation of native vegetation)

4.5.1 There is a map of the farm which shows the native vegetation.

4.5.2 There is a plan, which is being implemented, to ensure that the native vegetation is being maintained (except areas covered under Criterion 4.4)

4.5.3 No hunting of rare, threatened or endangered species takes place on the property.

(Criterion 5.10. Appropriate measures are implemented to allow for coexistence of different production systems)

Guidance: When a change in soybean production practices is introduced which could impact on neighbouring production systems, it is the responsibility of the producer making the change to implement a buffer strip of 30 m (e.g. in areas where production is generally GM, it is the responsibility of an organic or non-GM farmer to maintain the buffer around his own production. In areas where production is mainly non-GM or organic, a farmer planting GM or using chemicals should maintain a buffer).

Bonsucro EU (✓)

(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)

5.7.1 Percentage of greenfield expansion or new sugarcane project covered by ESIA

Greenergy (✓)

I2.3.1 Documentation of the status of rare, threatened or endangered species and high conservation value habitats in and around the production site.

I4.2.3 Pests, diseases and weeds are effectively managed using appropriate Integrated Pest Management (IPM) techniques.

This indicator was identified as being relevant to the criteria based on the premise that minimising use of pesticides will lower the risk of contamination of water.

Alternative methods for the control of pests, diseases and invasive plants (mechanical, physical and biological) should be used where possible.

ISCC-EU (✓)

2.1.2 Where production of raw material does not interfere with protection purposes (set in Principle 1), appropriate management measures shall be implemented to avoid damage or deterioration of habitats. If evidence is provided that the production of the raw material does not interfere with the protection purposes, cultivation is only allowed if appropriate management measures are identified and implemented. Legal requirements relating to the protection of species and habitats must be met and damage to or deterioration of habitats is avoided. Illegal or inappropriate hunting, fishing, trapping or collecting activities in these areas are controlled as far as possible and, if necessary, prohibited.

Existing ecological corridors and important landscape elements shall be maintained or, if necessary, restored to minimize fragmentation of the protected habitats. This shall take place in accordance with the type of terrain, wildlife and agricultural practices. Around all protected areas (covered in Principle 1), set aside land or wildlife corridors, appropriate buffer zones shall be protected, restored or set up.

2.1.3 The cultivation of highly invasive species shall be prevented

If a species is officially prohibited in the country of operation, it shall not be cultivated. The introduction of alien species, which are not already established in the country or region, which show a high risk of invasive behaviour in a region, is prohibited or shall be in line with existing regulatory frameworks for such an introduction.

2.3.1 Conservation of soils. Crops should be grown on suitable soils. In order to ensure a 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:

(...)

- Maintaining and improving soil biodiversity;

(...)

(Criterion 2.7 Integrated Pest Management (IPM))

(Criterion 2.8 Use of Plant Protection Products (PPP))

GGL-Forest (✓)

2.2g Plans for the identification and protection of rare, threatened and/or endangered species.

Principle 3 Environmental impact

Criteria 3.1 The forest management is aimed at conservation of biological diversity and forest integrity, water resources, soils, unique ecosystems and landscapes.

4. Soil

4.1. Erosion

GBEP (✓)

2. Soil quality (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)

RED (~)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Environment, climate change, good agricultural condition of land: Soil and carbon stock

RSB (GLOBAL) (✓)

7.b.i.2. If evidence exists that the operation will directly affect ecosystem functions and services, the participating operator provides objective evidence demonstrating that management of her/his/its biomass/biofuels operation(s) effectively maintains or enhances the ecosystem functions and services identified both inside, and outside the site(s) of the biomass/biofuels operation(s).

Guidance: The management practices in the ESMP may include:

For ecosystem functions:(...)

For Ecosystem services:(...)

- Actions to control and minimize soil disturbance, erosion and compaction including the avoidance of land clearance on sensitive or highly erodible soils, especially on steep slopes, and positive soil restoration measures where appropriate.(...)

8.a.i.1. The participating operator provides objective evidence demonstrating that soil erosion is minimized through the design of feedstock production and through the use of specific management practices (e.g. crop rotation, direct planting, maintaining vegetative ground cover, terracing, maintaining or creating tree hedges, etc.).

8.a.i.2. The participating operator provides objective evidence demonstrating an understanding of the soil erosion issues and organic matter content in the biomass/biofuels production area of the operation(s), and the impacts of biomass/biofuels production on the maintenance or enhancement of soil properties.

8.a.i.3. The participating operator provides objective evidence demonstrating implementation of practices to reduce or avoid soil erosion and compaction, and to maintain or improve soil organic matter.

SBP (~)

2.2.2. The BP has control systems and procedures for verifying that feedstock is sourced from forests where management maintains or improves soil quality (CPET S5b)

RSPO RED(✓)

(Criterion 4.3. Practices minimise and control erosion and degradation of soils)

4.3.1 (M) Maps of any fragile soils shall be available.

4.3.2 A management strategy shall be in place for plantings on slopes above a certain limit (this needs to be soil and climate specific).

4.3.3 A road maintenance programme shall be in place.

4.3.4 (M) Subsidence of peat soils shall be minimised and monitored. A documented water and ground cover management programme shall be in place.

4.3.5 Drainability assessments shall be required prior to replanting on peat to determine the long-term viability of the necessary drainage for oil palm growing.

4.3.6 A management strategy shall be in place for other fragile and problem soils (e.g. sandy, low organic matter, acid sulphate soils).

RTRS EU RED (✓)

5.1.1 Good agricultural practices are implemented to minimize diffuse and localized impacts on surface and ground water quality from chemical residues, fertilisers, erosion or other sources and to promote aquifer recharge.

5.3.1 Knowledge of techniques to maintain soil quality (physical, chemical and biological) is demonstrated and these techniques are implemented

5.3.2 Knowledge of techniques to control soil erosion is demonstrated and these techniques are implemented

(Criterion 7.4 Extensive planting on steep terrain, and/or marginal and fragile soils, including peat, is avoided)

7.4.1 Maps identifying marginal and fragile soils, including excessive gradients and peat soils, shall be available and used to identify areas to be avoided

7.4.2 (M) Where limited planting on fragile and marginal soils, including peat, is proposed, plans shall be developed and implemented to protect them without incurring adverse impacts.

Bonsucro EU (~)

5.2.4 Soil surface mechanically tilled per year (% of area under cane). NOTES: To minimise the opportunity for erosion. Percentage of soil surface tilled per year. Only tillage wider 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.

4.1.2. Percentage of areas defined internationally or nationally as legally protected or classified as of High Conservation Value planted to sugarcane after the cut-off date of 1 January 2008. HCV 4 Areas that provide basic services of nature in critical situations (e.g. watershed protection, erosion control)

Greenergy (✓)

13.2.1 Documentation of soil management plan aimed at sustainable soil management, erosion prevention and erosion control.

13.2.2 Documented operating procedures for good agricultural practices must be implemented and monitored with respect to:

- Prevention and control of erosion
- Maintaining soil fertility.

ISCC-EU (✓)

(Criterion 2.3 Soil conservation and avoidance of soil degradation)

2.3.1 Conservation of soils

Crops should be grown on suitable soils. In order to ensure a 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:

- Prevention and control of erosion; (...)

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 abovementioned aspects must be in place. Applying precautionary measures prevents soil degradation. Appropriate management measures include inter alia crop rotations and intercropping, landscaping elements or an appropriate type and use of machinery. In order to maintain or improve soil conditions, periodic soil analysis shall be conducted, on e.g. soil pH, macro- and micronutrients or soil organic matter.

2.3.2 Field cultivation techniques used to reduce the possibility of soil erosion

Evidence of measures of reduced soil erosion is available. 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 to 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 (including wind- as well as water erosion) and which 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).

GGL-Agri (✓)

4.5 Measures have to be taken to minimize soil run-of and sedimentation.

GGL-Forest (✓)

Principle 3 Environmental impact

Criteria 3.1 The forest management is aimed at conservation of biological diversity and forest integrity, water resources, soils, unique ecosystems and landscapes

3.2 The following issues are included in the management plan: (...)

3.2a Environment in general:(...)

VI. Measures taken to prevent erosion, improve soil conditions, etc.

3.2b Roads, waterways and air routes: (...)

III. Mountains, slopes, gradients.

IV. Areas susceptible to erosion.

4.2. Soil Organic C

GBEP (✓)

2. Soil quality (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)

RED (~)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance.
Area: Environment, climate change, good agricultural condition of land: Soil and carbon stock

RSB (GLOBAL) (✓)

8.a.i.3. The participating operator provides objective evidence demonstrating implementation of practices to reduce or avoid soil erosion and compaction, and to maintain or improve soil organic matter.

8.a.i.4. The participating operator provides objective evidence demonstrating that the use of agricultural and/or forestry residual materials for feedstock production, including lignocellulosic material, have and/or is not affecting the long-term soil stability and organic matter content of the soils in the biomass/biofuels operation(s) of the participating operator.

8.a.i.7. The participating operator provides objective evidence demonstrating that the Soil Management Plan is based on continuous monitoring (e.g. at minimum once per season and once per crop rotation, etc.) of physical, chemical and biological properties of the soils and other related factors (e.g. rainfall, water availability, run-off and other conditions, climatic conditions, size and layout of the production area, etc.) in and around the biomass/biofuels production area of the operation(s) of the participating operator, as collected through the impact assessment studies or other equivalent source.

8.a.i.8. Where the Soil Impact Assessment demonstrated that the soil conditions were already optimal, the participating operator provides objective evidence demonstrating that implementation of Soil Management Plan effectively prevents (and if necessary mitigates) alteration of physical, chemical and/or biological soil properties including soil organic matter. Where the Soil Impact Assessment demonstrated that the soil conditions were below optimal, the participating operator provides objective evidence demonstrating that implementation of Soil Management Plan effectively reverts soil degradation and restores physical, chemical and/or biological soil properties to optimal levels.

SBP (✓)

2.2.2. The BP has control systems and procedures for verifying that feedstock is sourced from forests where management maintains or improves soil quality (CPET S5b)

RSPO RED(✓)

4.2.1 There shall be evidence that good agriculture practices, as contained in Standard Operating Procedures (SOPs), are followed to manage soil fertility to a level that ensures optimal and sustained yield, where possible. Guidance: Long-term fertility depends on maintaining the structure, organic matter content, nutrient status and microbiological health of the soil.

RTRS EU RED (✓)

4.3.3. Soil organic matter is monitored to quantify change in soil carbon and steps are taken to mitigate negative trends.

5.3.1 Knowledge of techniques to maintain soil quality (physical, chemical and biological) is demonstrated and these techniques are implemented.

5.3.3 Appropriate monitoring, including soil organic matter content, is in place.

Bonsucro EU (-)

5.2.3 % Ground cover of tops or leaves after harvest

5.2.5 Percentage fields with samples showing analyses within acceptable limits for pH

Greenergy (✓)

I3.2.2 Documented operating procedures for good agricultural practices must be implemented and monitored with respect to:

- Prevention and control of erosion

- Maintaining soil fertility.

ISCC-EU (✓)

2.3.1 Conservation of soils

Crops should be grown on suitable soils. In order to ensure a 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: (...)

- Maintaining and improving soil organic matter; (...)

In order to maintain or improve soil conditions, periodic soil analysis shall be conducted, on e.g. soil pH, macro- and micronutrients or soil organic matter.

2.4.1 Soil organic matter is preserved

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.

GGL-Agri (✓)

3.3 The general planning, management and utilization of land resources and the preservation of soil fertility are defined and executed.

GGL-Forest (~)

Principle 3 Environmental impact

Criteria 3.1 The forest management is aimed at conservation of biological diversity and forest integrity, water resources, soils, unique ecosystems and landscapes

3.2 The following issues are included in the management plan: (...)

3.2a Environment in general: (...)

VI. Measures taken to prevent erosion, improve soil conditions, etc.

4.3. Soil Nutrient Balance

GBEP (✓)

2. Soil quality (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)

RSB (GLOBAL) (✓)

8.a.i.7. The participating operator provides objective evidence demonstrating that the Soil Management Plan is based on continuous monitoring (e.g. at minimum once per season and once per crop rotation, etc.) of physical, chemical and biological properties of the soils and other related factors (e.g. rainfall, water availability, run-off and other conditions, climatic conditions, size and layout of the production area, etc.) in and around the biomass/biofuels production area of the operation(s) of the participating operator, as collected through the impact assessment studies or other equivalent source.

8.a.i.8. Where the Soil Impact Assessment demonstrated that the soil conditions were already optimal, the participating operator provides objective evidence demonstrating that implementation of Soil Management Plan effectively prevents (and if necessary mitigates) alteration of physical, chemical and/or biological soil properties including soil organic matter. Where the Soil Impact Assessment demonstrated that the soil conditions were below optimal, the participating operator provides objective evidence demonstrating that implementation of Soil Management Plan effectively reverts soil degradation and restores physical, chemical and/or biological soil properties to optimal levels.

SBP (✓)

2.2.2. The BP has control systems and procedures for verifying that feedstock is sourced from forests where management maintains or improves soil quality (CPET S5b)

RSPO RED(✓)

4.2.1 There shall be evidence that good agriculture practices, as contained in Standard Operating Procedures (SOPs), are followed to manage soil fertility to a level that ensures optimal and sustained yield, where possible.

4.2.3 There shall be evidence of periodic tissue and soil sampling to monitor changes in nutrient status.

4.2.4 A nutrient recycling strategy shall be in place, and may include use of Empty Fruit Bunches (EFB), Palm Oil Mill Effluent (POME), and palm residues after replanting.

RTRS EU RED (✓)

5.3.1 Knowledge of techniques to maintain soil quality (physical, chemical and biological) is demonstrated and these techniques are implemented.

Bonsucro EU (~)

5.2.5 Percentage fields with samples showing analyses within acceptable limits for pH

Greenergy (✓)

13.2.2 Documented operating procedures for good agricultural practices must be implemented and monitored with respect to:

- Prevention and control of erosion
- Maintaining soil fertility.

ISCC-EU (✓)

2.3.1 Conservation of soils

Crops should be grown on suitable soils. In order to ensure a 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: (...)

- Maintaining and improving soil nutrient balance; (...)
- Maintaining and improving soil pH; (...)

In order to maintain or improve soil conditions, periodic soil analysis shall be conducted, on e.g. soil pH, macro- and micronutrients or soil organic matter.

GGL-Agri (✓)

3.3 The general planning, management and utilization of land resources and the preservation of soil fertility are defined and executed.

GGL-Forest (~)

Principle 3 Environmental impact

Criteria 3.1 The forest management is aimed at conservation of biological diversity and forest integrity, water resources, soils, unique ecosystems and landscapes

3.2 The following issues are included in the management plan: (...)

3.2a Environment in general: (...)

VI. Measures taken to prevent erosion, improve soil conditions, etc.

5. Water

5.1. Water availability and regional water stress

GBEP (✓)

5. Water use and efficiency

RED (~)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Environment, climate change, good agricultural condition of land: Water.

RSB (GLOBAL) (✓)

(Criterion 9a. Biofuel operations shall respect the existing water rights of local and indigenous communities)

9.a.i.1. The participating operator provides objective evidence demonstrating that her/his/its biomass/biofuels operation(s) do not negatively affect (i.e. reduce and/or alter in quality or quantity) the water supply to communities which rely on the same water resource(s), as described in the RSB Screening Exercise (RSBGUI-01-002-02). This may include objective evidence such as:

- identifying the communities which rely on the same water resource(s) as her/his/its biomass/biofuels operation(s);
- analysing the water supply to communities which rely on the same water resource(s);
- analysing whether the water supply to communities which rely on the same water resource(s) is affected in quality or quantity by her/his/its biomass/biofuels operation(s).

9.a.i.2. The participating operator provides objective evidence demonstrating continuous monitoring of the actual and potential impacts of her/his/its biomass/biofuels operation(s) on the availability of water resource(s) within the local community.

9.a.i.5. If the screening exercise indicated any significant potential impacts of biofuel operations on water availability within the local community, the participating operator provides objective evidence demonstrating that a water rights impact assessment has been completed and any actual or potential negative impacts of her/his/its biomass/biofuels operation(s) on the availability of water resource(s) within the local community have been mitigated.

9.a.i.6. The participating operator provides objective evidence demonstrating that the following steps were undertaken:

- identify all stakeholders which rely on the same water resource(s);
- identify formal water rights relating to the same water resource(s);
- identify customary water rights relating to the same water resource(s);
- evaluate and identify measures to fully protect the formal or customary water rights to the same water resource(s) and to prevent infringement and/or compromising of such rights;
- ensure that the formal or customary water rights to the same water resource(s) are only modified based on Free Prior and Informed Consent of stakeholders relating to and/or relying on the same water resource(s); and
- evaluate and identify measures to continuously monitor and ensure comprehensive implementation of the requirements detailed in indicator 9.a.i.6. as listed above.

9.c.i1. The participating operator provides objective evidence demonstrating that her/his/its biomass/biofuels operation(s) does/do not contribute to exceeding the replenishment capacity of the water table(s), watercourse(s) or water tank(s) at any time during the year.

9.c.i.2. Where freshwater intensive biomass/biofuels operations are established in drought prone areas or where irrigated crops are used in drought prone areas, the participating operator provides objective evidence demonstrating that best available practices are used, and that measures are implemented to mitigate changes in water quantity and quality.

9.c.i.3. In drought-prone areas, irrigation is not used unless the operator can demonstrate objective evidence that the level of the water resource used remains stable.

9.c.i.4. The participating operator provides objective evidence demonstrating that the use of water from natural water bodies for her/his/its biomass/biofuels operation(s) does not result in a permanent change in its natural course or change the physical, chemical or biological equilibrium the water body had before the biomass/biofuels operation(s) started.

9.c.i.7 The participating operator provides objective evidence demonstrating that any potential negative impacts of her/his/its biomass/biofuels operation(s) on local water tables, watercourses, and ecosystem needs will be mitigated.

SBP (✓)

2.2.6. The BP has control systems and procedures to verify that negative impacts on ground and surface water from forest management are minimised (CPET S5b).

2.5.2. The BP has control systems and procedures for verifying that production of feedstock does not endanger food, water supply or subsistence means of communities, where the use of this specific feedstock or water is essential for the fulfilment of basic needs.

RSPO RED(✓)

(Criterion 4.4. Practices maintain the quality and availability of surface and ground water)

4.4.1 An implemented water management plan shall be in place.

4.4.2 (M) Protection of water courses and wetlands, including maintaining and restoring appropriate riparian and other buffer zones (refer to national best practice and national guidelines) shall be demonstrated.

RTRS EU RED (✓)

5.1.1 Good agricultural practices are implemented to minimize diffuse and localized impacts on surface and ground water quality from chemical residues, fertilisers, erosion or other sources and to promote aquifer recharge.

5.1.2 There is monitoring, appropriate to scale, to demonstrate that the practices are effective.

5.1.4 Where irrigation is used, there is a documented procedure in place for applying best practices and acting according to legislation and best practice guidance (where this exists), and for measurement of water utilization.

5.2.3 Natural wetlands are not drained and native vegetation is maintained.

Greenergy (~)

14.1.1 No evidence of noncompliance with relevant national and local laws and regulations including:

- Environmental Impact Assessment
- Waste storage and handling
- Pesticides and agro-chemicals
- Fertiliser
- Irrigation and water usage.

ISCC-EU (✓)

2.5.2 The producer respects existing water rights, both formal and customary, and can justify the irrigation with respect to social and environmental sustainability. Local legislation is followed

Irrigation with other than rainwater is only allowed with a permit of the responsible authority. If ground water is used for irrigation, the producer holds an irrigation permit (official license) or, if not applicable, assesses and evaluates use and recharge rates of the water source.

The producer respects existing water rights, both formal and customary (including those of local communities and indigenous people), and can justify the irrigation in light of accessibility of water for human consumption. Adverse effects for downstream users must be prevented. Local legislation is followed.

2.5.3 Application of good agricultural practices to reduce water usage and to maintain and improve water quality

Good agricultural practices are implemented to reduce the unsustainable water use, the abstraction of unsustainable water sources and to minimize diffuse and localized inputs of chemical residues, fertilisers, erosion or other pollution sources to ground and surface water.

Irrigation water should only be abstracted in a way that recharge rates compensate water abstraction. To protect the environment, water is abstracted

from a sustainable source. The producer can justify the method of irrigation used in light of water conservation. Timing and amount of irrigation is tailored to crop requirements to meet planned yield and quality levels under local conditions. Documentation of water management plan aimed at sustainable water use and prevention of water pollution shall exist. Annual documentation of applied good agricultural practices with respect to:

- Efficient water usage;
- Responsible use of organic fertilisers and agro-chemicals;
- Waste discharge.

GGL-Agri (✓)

4.2 Monitoring of the irrigation performance.

4.7 Long term strategies and implementation program have to be developed on water use under scarce conditions.

4.8 Waste water re-use has to be part of the agriculture management system.

5.2. Water use efficiency

GBEP (✓)

5. Water use and efficiency

RED (~)

(EU) No 1305/2013

(5) promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors, with a focus on the following areas:

(a) increasing efficiency in water use by agriculture;

RSB (GLOBAL) (✓)

9.b.i.1. The participating operator provides objective evidence demonstrating that a water management plan relating to her/his/its biomass/biofuels operation(s) which ensures efficient use of the water resource(s) and that water quality is maintained or enhanced, has been integrated into its ESMP and implemented accordingly.

RSPO RED(✓)

4.4.4 Mill water use per ton of Fresh Fruit Bunches (FFB) shall be monitored.

Bonsucro EU (✓)

5.2.1 Net water consumed per unit mass of product

5.2.2 For irrigated cane, efficient use of water

Greenergy (✓)

14.2.2 Documented operating procedures for good agricultural practices must be implemented and monitored with respect to:

- Efficient water usage
- Responsible use of agro-chemicals
- Waste discharge

ISCC-EU (✓)

2.5.3 Application of good agricultural practices to reduce water usage and to maintain and improve water quality

Good agricultural practices are implemented to reduce the unsustainable water use, the abstraction of unsustainable water sources and to minimize diffuse and localized inputs of chemical residues, fertilisers, erosion or other pollution sources to ground and surface water.

Irrigation water should only be abstracted in a way that recharge rates compensate water abstraction. To protect the environment, water is abstracted from a sustainable source. The producer can justify the method of irrigation used in light of water conservation. Timing and amount of irrigation is tailored to crop requirements to meet planned yield and quality levels under local conditions.

Documentation of water management plan aimed at sustainable water use and prevention of water pollution shall exist. Annual documentation of applied good agricultural practices with respect to:

- Efficient water usage; (...)

Appropriate management measures to improve water quality could include inter alia setting up buffer zones around water bodies, an efficient handling of fertilisers including sewage sludge, wastewater treatment, installing efficient irrigation

techniques (including rainwater harvesting, drain design) as well as timing the irrigation appropriately to crop requirements. (...)

GGL-Agri (✓)

4.1 Efficiency and productivity of agricultural water use for better utilization of limited water resources has to increase.

5.3. Water quality

GBEP (✓)

6. Water quality

RED (~)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Environment, climate change, good agricultural condition of land: Water

RSB (GLOBAL) (✓)

7.b.i.2. If evidence exists that the operation will directly affect ecosystem functions and services, the participating operator provides objective evidence demonstrating that management of her/his/its biomass/biofuels operation(s) effectively maintains or enhances the ecosystem functions and services identified both inside, and outside the site(s) of the biomass/biofuels operation(s). Guidance: The management practices in the ESMP may include:

For ecosystem functions:(...)

For Ecosystem services:

- Actions to control and minimize disturbance to water quality and water flows e.g. the creation or protection of riparian buffer zones of natural vegetation, and the maintenance of natural vegetation in important water catchments, especially steep slopes.(...)

9.a.i.1. The participating operator provides objective evidence demonstrating that her/his/its biomass/biofuels operation(s) do not negatively affect (i.e. reduce and/or alter in quality or quantity) the water supply to communities which rely on the same water resource(s). This usually includes objective evidence:

- identifying the communities which rely on the same water resource(s) as her/his/its biomass/biofuels operation(s);

- analysing the water supply to communities which rely on the same water resource(s);

- analysing whether the water supply to communities which rely on the same water resource(s) is affected in quality or quantity by her/his/its biomass/biofuels operation(s).

9.b.i.1. The participating operator provides objective evidence demonstrating that a water management plan relating to her/his/its biomass/biofuels operation(s) which ensures efficient use of the water resource(s) and that water quality is maintained or enhanced, has been integrated into its ESMP and implemented accordingly.

Criterion 9d. Biofuel operations shall contribute to the enhancement or maintaining of the quality of the surface and groundwater resources.

9.d.i.1. The participating operator provides objective evidence demonstrating that biofuels are not produced or processed in critical aquifer recharge areas, without official authorization from relevant legal authorities.

9.d.i.2. The participating operator provides objective evidence demonstrating that best available practices to maintain or enhance the quality of water resources to their optimal level are implemented in her/his/its operation(s).

9.d.i.3. The participating operator provides objective evidence demonstrating that sufficient precautions have been taken to contain effluents from her/his/its biomass/biofuels operation(s) and prevent contamination of water resources. This includes treatment and/or recycling of waste water and the establishment of buffer zones.

SBP (~)

2.2.6. The BP has control systems and procedures to verify that negative impacts on ground and surface water from forest management are minimised (CPET S5b).

RSPO RED (✓)

4.4.3 Appropriate treatment of mill effluent to required levels and regular monitoring of discharge quality, especially Biochemical Oxygen Demand (BOD), shall be in compliance with national regulations

RTRS EU RED (✓)

5.1.1 Good agricultural practices are implemented to minimize diffuse and localized impacts on surface and ground water quality from chemical residues, fertilisers, erosion or other sources and to promote aquifer recharge.

5.1.2 There is monitoring, appropriate to scale, to demonstrate that the practices are effective.

5.1.3 Any direct evidence of localized contamination of ground or surface water is reported to, and monitored in collaboration with local authorities

Bonsucro EU (✓)

4.1.1 Dissolved oxygen in receiving stream

Greenergy (✓)

(Criterion C4.2 Application of good agricultural practices to reduce water usage and to maintain and improve water quality)

14.2.1 Documentation of water management plan aimed at sustainable water use and prevention of water pollution.

14.2.2 Documented operating procedures for good agricultural practices must be implemented and monitored with respect to:

- Efficient water usage
- Responsible use of agro-chemicals
- Waste discharge

ISCC-EU (✓)

2.5.1 Mineral oil products and plant protection products are stored in an appropriate manner, which reduces the risk of contaminating the environment

The storages of the material are consistent with best available technology and respective laws and prevent contamination by the stored materials.

2.5.3 Application of good agricultural practices to reduce water usage and to maintain and improve water quality

Good agricultural practices are implemented to reduce the unsustainable water use, the abstraction of unsustainable water sources and to minimize diffuse and localized inputs of chemical residues, fertilisers, erosion or other pollution sources to ground and surface water.

Irrigation water should only be abstracted in a way that recharge rates compensate water abstraction. To protect the environment, water is abstracted from a sustainable source. The producer can justify the method of irrigation used in light of water conservation. Timing and amount of irrigation is tailored to crop requirements to meet planned yield and quality levels under local conditions.

Documentation of water management plan aimed at sustainable water use and prevention of water pollution shall exist. Annual documentation of applied good agricultural practices with respect to:

- Efficient water usage;
- Responsible use of organic fertilisers and agro-chemicals;
- Waste discharge.

Appropriate management measures to improve water quality could include inter alia setting up buffer zones around water bodies, an efficient handling of fertilisers including sewage sludge, wastewater treatment, installing efficient irrigation techniques (including rainwater harvesting, drain design) as well as timing the irrigation appropriately to crop requirements. Monitoring which is appropriate to scale demonstrates that applied practices are effective (e.g. by monitoring the Biological Oxygen Demand (BOD) in order to monitor water quality management measures). Any direct evidence of localized contamination of water bodies (ground- or surface waters) is reported to local authorities and – if requested – monitored in collaboration with the authorities.

2.6.1 During the application of fertilisers with a considerable nitrogen content care is taken not to contaminate the surface and ground water

The producer must demonstrate that he observes at least a distance of 3 m to riverbanks. He takes care that there is no run-off of applied fertiliser into surface water bodies and the ground water. During application, weather conditions (e.g. wind speed and –direction, temperature) are examined and taken into account.

2.6.6 Fertilisers are stored in an appropriate manner, which reduces the risk of contamination of water courses

All inorganic fertilisers, e.g. powders, granules or liquids are stored in a manner which poses minimum risk of contamination to water sources, e.g. stored liquid fertiliser must be surrounded by an impermeable barrier (according to national and local legislation) or is stored in a container of at least 10% larger capacity (if there is no applicable legislation). Consideration should be given to the proximity to water courses and flood risks.

(Criterion 2.8 Use of Plant Protection Products (PPP))

2.8.9 Surplus application mix or tank washings are disposed of in a way not contaminating the ground water

It must be secured and documented that the producer is aware of national or local legislation and the legislation is observed. When surplus application mix or tank washings are applied onto designated fallow land, it can be demonstrated that this is legal practice and all the treatments have been recorded in the same manner and detail as a normal plant protection product application. Surface water contamination must be avoided.

GGL-Agri (✓)

4.4 Water quality has to be monitored on biological, physical and chemical quality.

6. Air

6.1. SO₂ equivalents

GBEP (✓)

4 Emissions of non-GHG air pollutants, including air toxics

RSB (GLOBAL) (✓)

10.a.i.1. The participating operator provides objective evidence demonstrating that an emission control plan is included in the ESMP and implemented, which:

- identifies all sources of air pollution in the biomass/biofuels operations of the participating operator;
- identifies the pollutants released at the biomass/biofuel operations, including carbon monoxide, nitrogen oxides, volatile organic compounds, particulate matter, sulfur compounds, dioxins and other substances recognized as potentially harmful to the environment and/or human health are released during biomass/biofuel operations;
- identifies each source of emissions and the amount and nature of emissions per source;
- identifies measures implemented to mitigate air pollution, or else provides the rationale for not utilizing such strategies;

- monitors the effectiveness of the measures identified and implemented to mitigate air pollution;

SBP (~)

2.2.7. The BP has control systems and procedures for verifying that air quality is not adversely affected by forest management activities.

RSPO RED (✓)

5.6.1 (M) An assessment of all polluting activities shall be conducted, including gaseous emissions, particulate/soot emissions and effluent

5.6.2 (M) Significant pollutants and greenhouse gas (GHG) emissions shall be identified, and plans to reduce or minimise them implemented.

5.6.3 A monitoring system shall be in place, with regular reporting on progress for these significant pollutants and emissions from estate and mill operations, using appropriate tools.

Bonsucro EU (✓)

(Criterion 5.5 To reduce emissions and effluents. To promote recycling of waste streams where practical)

5.5.1 Atmospheric acidification burden per unit mass product

Greenergy (~)

15.1.1 No evidence of noncompliance with national and local laws and regulations with respect to:

- Environmental Impact Assessment
- Air emissions
- Waste management
- Burning practices

6.2. PM₁₀

GBEP (✓)

4 Emissions of non-GHG air pollutants, including air toxics

RSB (GLOBAL) (✓)

10.a.i.1. The participating operator provides objective evidence demonstrating that an emission control plan is included in the ESMP and implemented, which:

- identifies all sources of air pollution in the biomass/biofuels operations of the participating operator;
- identifies the pollutants released at the biomass/biofuel operations, including carbon monoxide, nitrogen oxides, volatile organic compounds, particulate matter, sulfur compounds, dioxins and other substances recognized as potentially harmful to the environment and/or human health are released during biomass/biofuel operations;
- identifies each source of emissions and the amount and nature of emissions per source;
- identifies measures implemented to mitigate air pollution, or else provides the rationale for not utilizing such strategies;
- monitors the effectiveness of the measures identified and implemented to mitigate air pollution;

SBP (~)

2.2.7. The BP has control systems and procedures for verifying that air quality is not adversely affected by forest management activities.

RSPO RED (✓)

5.6.1 (M) An assessment of all polluting activities shall be conducted, including gaseous emissions, particulate/soot emissions and effluent

5.6.2 (M) Significant pollutants and greenhouse gas (GHG) emissions shall be identified, and plans to reduce or minimise them implemented.

5.6.3 A monitoring system shall be in place, with regular reporting on progress for these significant pollutants and emissions from estate and mill operations, using appropriate tools.

Bonsucro EU (✓)

(Criterion 5.5 To reduce emissions and effluents. To promote recycling of waste streams where practical)

5.5.2 Nonhazardous solid residues of production per ton cane

Greenergy (~)

15.1.1 No evidence of noncompliance with national and local laws and regulations with respect to:

- Environmental Impact Assessment
- Air emissions
- Waste management
- Burning practices

7. Participation and transparency

7.1. *Effective participatory process*

GBEP (~)

9. Allocation and tenure of land for new bioenergy production. (...) If the land used for new bioenergy production is recognized as community/common land it is important to gather information regarding mechanisms of participation or consultation carried out by the new owner with the local community. If the land is recognized as land with secure rights by national legislation, it is important to gather the evidence of the negotiation agreement for any contingent compensation between the new owner or other tenure right holder and the local community (...)

RSB (GLOBAL) (✓)

2.b.i.4. The participating operator provides objective evidence demonstrating that: (...)

- participation of affected stakeholders in engagement, consultation, and if required involvement in decision-making is based on free, prior informed consent by all involved (...).

9.a.i.4. The participating operator provides objective evidence demonstrating that the use of the water resource(s) for her/his/its biomass/biofuels operation(s) has been agreed with free, prior, informed consent by stakeholders which rely on the same water resource(s).

12.b.i.1. The participating operator provides objective evidence that all decisions regarding land rights and land use rights related to her/his/its biomass/biofuels operation(s) were and are based on the Free, Prior, and Informed Consent of all

stakeholders involved, following the guidance in the Impact Assessment Guidelines

RSPO RED (✓)

1.1.1 There shall be evidence that growers and millers provide adequate information on (environmental, social and/or legal) issues relevant to RSPO Criteria to relevant stakeholders for effective participation in decision making.

(Criterion 2.3 Use of the land for oil palm does not diminish the legal, customary or user rights of other users without their free, prior and informed consent)

2.3.2 Copies of negotiated agreements detailing the process of free, prior and informed consent (FPIC) shall be available and shall include:

a) Evidence that a plan has been developed through consultation and discussion with all affected groups in the communities, and that information has been provided to all affected groups, including information on the steps that shall be taken to involve them in decision making;

b) Evidence that the company has respected communities' decisions to give or withhold their consent to the operation at the time that this decision was taken;

c) Evidence that the legal, economic, environmental and social implications for permitting operations on their land have been understood and accepted by affected communities, including the implications for the legal status of their land at the expiry of the company's title, concession or lease on the land.

(Criterion 6.1) Aspects of plantation and mill management that have social impacts, including replanting, are identified in a participatory way, and plans to mitigate the negative impacts and promote the positive ones are made, implemented and monitored, to demonstrate continual improvement.

RTRS (~)

3.2.1. In the case of disputed use rights, a comprehensive, participatory and documented community rights assessment is carried out.

3.2.2 Where rights have been relinquished by traditional land users there is documented evidence that the affected communities are compensated subject to their free, prior, informed and documented consent.

Bonsucro EU (✓)

5.7.1 Percentage of greenfield expansion or new sugarcane project covered by ESIA. Cut-off date 1 January 2008. ESIA process shall start prior the formulation

phase of a project, focus on significant issues and involve key stakeholders to identify them, provide information on possible alternative or appropriate mitigation measures for making decision based on free prior informed consent (FPIC) process, monitor and evaluate implemented measures. The operator shall involve independent third party experts.

(Criterion 5.8 To ensure active engagement and transparent, consultative and participatory processes with all relevant stakeholders)

5.8.1 Existence of usage of a recognised and accessible grievance and dispute resolution mechanism for all stakeholders. Existence and usage of a mechanism which is accessible by all stakeholders. Stakeholders include but are not limited to workers, contracted workers, local communities, indigenous and tribal people. Ensure that when dispute, grievances and conflicts arise, the operator acts appropriately to resolve them through negotiated agreement between parties based on Free, Prior and Informed Consent.

5.8.2 Percentage of projects involving multi stakeholders where agreement has been reached by consensus driven process based on Free, Prior and Informed Consent

Greenergy (✓)

17.2.1 Policies and procedures for consultation and communication must be documented.

17.2.2 Lists of local communities and other interest groups, records of consultation and communication, and records of actions taken as a result of input from interest groups, must be maintained, appropriate to scale.

ISCC-EU (~)

4.9 All impacts for surrounding areas, communities, users and land owners taken into account and sufficiently compensated for

A participatory social impact assessment has been conducted, where all relevant stakeholders including local communities and indigenous people have been engaged. The report is publicly available in appropriate language to surrounding communities. On the basis of that report an action plan to address identified social impacts and a continued dialogue with surrounding communities is in place. Documents of regular meetings with communities (with two-way communication) and local government with listed risks and/or impacts and evidence of minuted negotiations or resolution processes are compiled.

GGL-Agri (✓)

2.2 Participation in the initiation and maintenance of district and village agricultural land resource planning assisted by management and conservation groups.

7.2. Information transparency**GBEP (~)**

9. Allocation and tenure of land for new bioenergy production (...) In addition, access to land is a sensitive matter in some countries. Where regulations are weakly enforced, a risk of getting distorted data could arise. Means to mitigate this risk could include a domestic transparent multi-stakeholder process involving relevant government authorities, private sector representatives and civil society representatives to inform and complement a formal process (...).

RSB (GLOBAL) (✓)

2.b.i.4. The participating operator provides objective evidence demonstrating that:

- information relevant for stakeholder engagement, consultation and stakeholder involvement in decision-making was available and accessible to affected stakeholders; (...) Documentation necessary to inform stakeholder positions shall be made freely available to stakeholders in a timely, open, transparent and accessible manner through distribution channels appropriate to the local conditions (...)

2.b.i.8. The participating operator provides objective evidence demonstrating that management documentation including all documentation related to the impact assessment and ESMP were publicly available, except where this is prevented by commercial confidentiality or where disclosure of information would result in negative environmental or social outcomes.

2.b.i.9. Stakeholders affected by the biomass/biofuels operation(s) of the participating operator confirm that management documentation including all documentation related to the impact assessment and ESMP of the participating operator was available and accessible.

RSPO RED (✓)

1.1.1 There shall be evidence that growers and millers provide adequate information on (environmental, social and/or legal) issues relevant to RSPO Criteria to relevant stakeholders for effective participation in decision making.

1.1.2 (M) Records of requests for information and responses shall be maintained.

1.2.1 (M) Publicly available documents shall include, but are not necessarily limited to:

- Land titles/user rights
- Occupational health and safety plans
- Plans and impact assessments relating to environmental and social impacts
- HCV documentation
- Pollution prevention and reduction plans
- Details of complaints and grievances
- Negotiation procedures
- Continual improvement plans
- Public summary of certification assessment report
- Human Rights Policy

(Criterion 6.2 There are open and transparent methods for communication and consultation between growers and/or millers, local communities and other affected or interested parties)

6.2.1 (M) Consultation and communication procedures shall be documented.

6.2.2 A management official responsible for these issues shall be nominated.

6.2.3 A list of stakeholders, records of all communication, including confirmation of receipt and that efforts are made to ensure understanding by affected parties, and records of actions taken in response to input from stakeholders, shall be maintained

(Criterion 6.10 Growers and millers deal fairly and transparently with smallholders and other local businesses)

6.10.1 Current and past prices paid for Fresh Fruit Bunches (FFB) shall be publicly available.

6.10.2 (M) Evidence shall be available that growers/millers have explained FFB pricing, and pricing mechanisms for FFB and inputs/services shall be documented (where these are under the control of the mill or plantation).

6.10.3 Evidence shall be available that all parties understand the contractual agreements they enter into, and that contracts are fair, legal and transparent.

6.10.4 Agreed payments shall be made in a timely manner.

RTRS EU RED (~)

1.2.1 There is documented evidence of rights to use the land (e.g. ownership document, rental agreement, court order etc.).

Bonsucro EU (✓)

5.7.1 Percentage of greenfield expansion or new sugarcane project covered by ESIA. Cut-off date 1 January 2008. ESIA process shall start prior the formulation phase of a project, focus on significant issues and involve key stakeholders to identify them, provide information on possible alternative or appropriate mitigation measures for making decision based on free prior informed consent (FPIC) process, monitor and evaluate implemented measures. The operator shall involve independent third party experts.

CRITERION 5.8 To ensure active engagement and transparent, consultative and participatory processes with all relevant stakeholders

(No indicators)

Greenergy (~)

17.2.1 Policies and procedures for consultation and communication must be documented.

17.2.2 Lists of local communities and other interest groups, records of consultation and communication, and records of actions taken as a result of input from interest groups, must be maintained, appropriate to scale.

ISCC-EU (~)

4.9 All impacts for surrounding areas, communities, users and land owners taken into account and sufficiently compensated for

A participatory social impact assessment has been conducted, where all relevant stakeholders including local communities and indigenous people have been engaged. The report is publicly available in appropriate language to surrounding communities. On the basis of that report an action plan to address identified social

impacts and a continued dialogue with surrounding communities is in place. Documents of regular meetings with communities (with two-way communication) and local government with listed risks and/or impacts and evidence of minuted negotiations or resolution processes are compiled.

8. Secure tenure of land

8.1. Compliance with the VGGT to secure land tenure and ownership

GBEP (✓)

9. Allocation and tenure of land for new bioenergy production

RSB (GLOBAL) (✓)

12.a.i.1. The participating operator provides objective evidence demonstrating that the formal and customary (traditional) land rights and land use rights relating to her/his/its biomass/biofuels operation(s) are not disputed.

12.a.i.2. Stakeholders confirm that the formal and any customary (traditional) land rights and land use rights relating to the biomass/biofuels operation(s) of the participating operator are not disputed.

12.a.i.4. The participating operator provides objective evidence demonstrating that the formal and customary (traditional) land rights and land use rights have been comprehensively assessed, established and documented following the guidelines detailed in the RSB Land Rights Assessment.

12.a.i.5. Stakeholders confirm that the formal and customary (traditional) land rights and land use rights relating to the biomass/biofuels operation(s) of the participating operator have been established.

SBP (✓)

1.2.1. The Biomass Producer has control systems and procedures to ensure that legality of ownership and land use can be demonstrated for the Supply Base.

2.5.1. The BP has control systems and procedures for verifying that legal, customary and traditional tenure and use rights of indigenous people and local communities related to the forest, are identified, documented and respected (CPET S9).

2.6.1. The BP has control systems and procedures for verifying that appropriate mechanisms are in place for resolving grievances and disputes, including those

relating to tenure and use rights, to forest management practices and to work conditions.

RSPO RED (✓)

2.2.1 (M) Documents showing legal ownership or lease, history of land tenure and the actual legal use of the land shall be available.

2.2.2 Legal boundaries shall be clearly demarcated and visibly maintained.

2.2.3 Where there are or have been disputes, additional proof of legal acquisition of title and evidence that fair compensation has been made to previous owners and occupants shall be available, and that these have been accepted with free, prior and informed consent (FPIC).

2.2.4 (M) There shall be an absence of significant land conflict, unless requirements for acceptable conflict resolution processes (see Criteria 6.3 and 6.4) are implemented and accepted by the parties involved.

2.2.5 For any conflict or dispute over the land, the extent of the disputed area shall be mapped out in a participatory way with involvement of affected parties (including neighbouring communities where applicable).

2.2.6 (M) To avoid escalation of conflict, there shall be no evidence that palm oil operations have instigated violence in maintaining peace and order in their current and planned operations.

RTRS EU RED (✓)

1.2.1 There is documented evidence of rights to use the land (e.g. ownership document, rental agreement, court order etc.).

Bonsucro EU (✓)

(Criterion 1.2 To demonstrate clear title to land and water in accordance with national practice and law)

1.2.1 The right to use land and water can be demonstrated

1.2.2 Land that is legitimately contested by other users

Greenergy (✓)

I2.1.1. No evidence of non-compliance with applicable national and local laws, decrees and regulations including: Land ownership and land use rights

I7.1.1 Documents showing legal ownership or lease must be available.

17.1.2 Identification of recognised legal and customary rights.

17.1.3 Evidence of negotiated agreements and discussions with local people must be available.

ISCC-EU (✓)

5.1 The producer can prove that the land is used legitimately and that traditional land rights have been secured

Documents show legal ownership or lease, history of land tenure and the actual legal use of the land. The producer must identify and respect existing land rights (see Principle 1). The rights of indigenous people are respected.

GGL-Forest (✓)

Principle 1 Long term tenure and use rights to the land and forest resources.

Criteria 1.1 Owner /forest manager demonstrates clear evidence of legal land use by having legal land title, customer right or lease agreement.

9. Employment and labor conditions

9.1. Full direct job equivalents along the full value chain

GBEP (✓)

12. Jobs in the bioenergy sector

ISCC-EU (~)

4.20 Other forms of social benefits are offered by the employer to employees, their families and/or community

(...) If appropriate, the employer makes opportunities of employment known locally.

9.2. Full direct job equivalents in the biomass consuming region (or country)

GBEP (✓)

12 Jobs in the bioenergy sector

RSB (GLOBAL) (✓)

5.a.i.5. Local workers confirm that the management of the biomass/biofuels operation(s) of the participating operator has preferred and continues to prefer local workers where available over migrant labor.

5.a.i.6. Local workers confirm that the management of the biomass/biofuels operation(s) of the participating operator has created and continues to create permanent employment opportunities.

SBP (✓)

2.3.3. Analysis shows that feedstock harvesting and biomass production positively contribute to the local economy.

RTRS EU RED (✓)

3.4.1 Employment opportunities are made known locally.

9.3. Human and labor rights**RSB (GLOBAL) (✓)**

4.a.i.1. Workers engaged in the operation(s) of the participating operator confirm that they are aware of, and have the right to freely organize, voluntarily negotiate their working conditions and bargain collectively with the management of the operation(s), as established in ILO Conventions 87 and 98.

4.b.i.1. The participating operator provides objective evidence demonstrating that her/his/its operation(s) does/do not engage in or support the use of forced, compulsory, bonded, trafficked or otherwise involuntary labor as defined in ILO Convention 29 either directly or through independent third parties (e.g. contractors, etc.) engaged in the operations.

4.c.i.1. The participating operator provides objective evidence demonstrating that her/his/its operation(s) does/do not engage children of age 14 and under (or the legal national age). (Exceptions may be made in the case of family farms – see 4.c.i.3., 4.c.i.4. and 4.c.i.5. below)

4.c.i.2. The participating operator provides objective evidence demonstrating that in her/his/its operation(s) workers under the age of 18 do not undertake

hazardous or dangerous work, as defined by ILO convention 138. In the case of family farms only: (4.c.i.3-4.c.i.6)

4.d.i.1. Workers engaged in the operation(s) of the participating operator confirm that they are not subjected to any form of discrimination in hiring, remuneration, benefits, access to training, promotion, termination, retirement or any other aspect of employment, based on race, color, gender, religion, political opinion, national extraction, social origin, sexual orientation, family responsibilities, marital status, union membership, age or any other condition that could give rise to discrimination.

4.d.i.2. Workers engaged in the operation(s) of the participating operator confirm that they are not subjected to corporal punishment, mental or physical oppression and coercion, verbal or physical abuse, sexual harassment or any other kind of intimidation in the workplace and where applicable in residences and other facilities provided by the operation(s) of the participating operator for use by workers.

4.e.i.5. Workers engaged in the operation(s) of the participating operator confirm that men and women earn equal pay for equal work.

4.e.i.1. The participating operator provides objective evidence demonstrating that all workers are paid at least the government regulated minimum wage in the specific industry sector for the applicable work as required by law, and that this includes all mandated wages, allowances and benefits.

4.e.i.10. Work plans of and workers engaged in the operation(s) of the participating operator confirm that the maximum number of hours worked per regular week does not exceed 48 hours on average.

4.e.i.11. Workers engaged in the operation(s) of the participating operator confirm that overtime work takes place only in exceptional circumstances (e.g. peak production periods), that overtime work is voluntary, and that the total number of work hours including overtime does not exceed 80 hours per week.

4.e.i.12. Workers engaged in the operation(s) of the participating operator confirm that overtime is paid according to legal requirements and existing industry standards, and that the pay for overtime is equal to or higher than the pay for regular work time.

SBP (✓)

1.6.1. The BP has control systems and procedures to ensure that feedstock is not sourced from areas where there are violations of traditional or civil rights.

2.7.1. The BP has control systems and procedures for verifying that Freedom of Association and the effective recognition of the right to collective bargaining are respected.

2.7.2. The BP has control systems and procedures for verifying that all forms of compulsory labour have been eliminated.

2.7.3. The BP has control systems and procedures to verify that child labour has been abolished.

2.7.4. The BP has control systems and procedures for verifying that discrimination in respect of employment and occupation is eliminated.

2.7.5. The BP has control systems and procedures for verifying that pay and employment conditions are fair and meet, or exceed, minimum requirements

RSPO RED (✓)

6.13.1 (M) A policy to respect human rights shall be documented and communicated to all levels of the workforce and operations

6.6.1 (M) A published statement in local languages recognising freedom of association shall be available.

6.9.1 (M) A policy to prevent sexual and all other forms of harassment and violence shall be implemented and communicated to all levels of the workforce.

6.9.2 (M) A policy to protect the reproductive rights of all, especially of women, shall be implemented and communicated to all levels of the workforce.

6.9.3 A specific grievance mechanism which respects anonymity and protects complainants where requested shall be established, implemented, and communicated to all levels of the workforce.

RTRS EU RED (✓)

2.2.2 Labor laws, union agreements or direct contracts of employment detailing payments and conditions of employment (e.g. working hours, deductions, overtime, sickness, holiday entitlement, maternity leave, reasons for dismissal, period of notice, etc.) are available in the languages understood by the workers or explained carefully to them by a manager or supervisor.

2.1 1 No forced, compulsory, bonded, trafficked or otherwise involuntary labor is used at any stage of production

2.1.2 No workers of any type are required to lodge their identity papers with anyone and no part of their salary, benefits or property is retained, by the owner or any 3rd party, unless permitted by law.

2.1.3 Spouses and children of contracted workers are not obliged to work on the farm.

2.1.4 Children and minors (below 18) do not conduct hazardous work or any work that jeopardizes their physical, mental or moral well being.

2.1.5 Children under 15 (or higher age as established in national law) do not carry out productive work. They may accompany their family to the field as long as they are not exposed to hazardous, unsafe or unhealthy situations and it does not interfere with their schooling

2.1.6 There is no engagement in, support for, or tolerance of any form of discrimination.

2.1.7 All workers receive equal remuneration for work of equal value, equal access to training and benefits and equal opportunities for promotion and for filling all available positions.

2.1.8 Workers are not subject to corporal punishment, mental or physical oppression or coercion, verbal or physical abuse, sexual harassment or any other kind of intimidation.

Bonsucro EU (✓)

(Criterion 2.1 To comply with ILO labour conventions governing child labour, forced labour, discrimination and freedom of association and the right to collective bargaining)

2.1.1 Minimum age of workers

2.1.2 Absence of forced or compulsory labour

2.1.3 Absence of discrimination

2.1.4 Respect the right of all workers to form and join trade unions and/ or to bargain collectively

Greenergy (✓)

(C6.1 Compliance with national law on working conditions and workers right.)

I6.1.1 No evidence of noncompliance with applicable national and local laws and regulations

I6.2.1 Workers' contracts are consistent with all applicable requirements in Principle 6.

I6.3.1 Evidence that the organisation has effectively informed workers of all applicable rights as covered in Principle 6

I6.4.1 The right to organise should be consistent with that established in ILO Conventions 87 and 98.

I6.4.2 Workers exercising this right should be free from discrimination or other adverse consequences.

I6.5.1 No evidence of children under 16 working other than as apprentices or on family farms.

I6.5.2 Evidence that children working on family farms are family members.

I6.5.3 Evidence that if children are working on family farms the work does not interfere with their educational, moral, social or physical development and the work day inclusive of school and transport should not exceed 10 hours

I6.6.1 No evidence that apprentices, aged 14-16, or young workers, aged 16 - 18 undertake hazardous or dangerous work.

I6.6.2 No evidence that young workers undertake work which may jeopardise their educational, moral, social and physical development

I6.8.1 Wages must be at least equivalent to the Brazilian national minimum wage or the industry standard, whichever is higher.

I6.8.3 Housing and other benefits are not automatically deducted from wages as an in-kind payment.

I6.8.4 Where workers operate on the basis of piecework, the pay rates must allow wages consistent with I6.8.1 to be earned during normal working hours and allocated in a transparent way.

I6.9.1 No evidence of discrimination based on individual characteristics and group membership or association like: Race, Caste, National Origin, Religion, Disability, Gender, Sexual Orientation, Union Membership, Political Affiliation, Age, marital status and those with HIV/AIDS, seasonal, migrant and temporary workers

(Criterion: C6.10 There is no forced labour including bonded labour as defined by ILO conventions 29 and 105)

16.10.1 No evidence that any part of workers' salary, benefits, property, or documents are retained in order to force workers to remain on the farm.

16.10.2 No evidence of any form of physical or psychological measure requiring workers to remain employed on the farm.

16.10.3 Spouses and children of contracted workers are not required to work on the farm.

ISCC-EU (✓)

The criteria listed here are based on internationally recognized requirements concerning social aspects (International Labour Organization, core ILO standards: ILO 29, 105, 138, 182, 87, 98, 100, 111).

4.1 A self-declaration on good social practice regarding human rights has been communicated to the employees and signed by the farm management and the employees' representative

4.2 Employment conditions comply with equality principles

4.3 There is no indication of discrimination (distinction, exclusion or preference) practiced that denies or impairs equality of opportunity, conditions or treatment based on individual characteristics and group membership or association. For example, on the basis of: race, caste, nationality, religion, disability, gender etc.

4.4 There is no indication of forced labour at the farm

4.5 Personnel is treated with dignity and respect

4.6. Workers have the freedom to join labour organizations or organize themselves to perform collective bargaining. Workers must have the right to organize and negotiate their working conditions. Workers exercising this right should not be discriminated against or suffer repercussions

4.7. The farm does pay a living wage which meets at least legal or industry minimum standards

4.8. The person responsible for workers' health, safety and good social practice and the elected individual(s) of trust have knowledge about and/or access to recent national labour regulations/collective bargaining agreements

4.9. All impacts for surrounding areas, communities, users and land owners taken into account and sufficiently compensated for

4.10. The management does hold regular two-way communication meetings with their employees where issues affecting the business or related to worker health, safety and welfare can be discussed openly

4.11. There is at least one worker or a workers' council elected freely and democratically who represent the interests of the staff to the management

4.12. There is a complaint form and/or procedure available on the farm, where employees and affected communities can make a complaint

4.13. All children living on the farm have access to quality primary school education

4.14. There are records that provide an accurate overview of all employees (including seasonal workers and subcontracted workers on the farm) and indicate full names, a job description, date of birth, date of entry, wage and the period of employment

4.15. No minors are employed on the farm.

4.16. All employees are provided with fair legal contracts.

4.17. There is a time recording system that shows daily working time and overtime on a daily basis for all employees

4.18. The working hours and breaks of the individual worker are indicated in the time records and comply with legal regulations and/or collective bargaining agreements. Overtime shall be voluntary and shall always be compensated at a premium rate.

4.19. Pay slips document the conformity of payment with at least legal regulations and/or collective bargaining agreements

4.20 Other forms of social benefits are offered by the employer to employees, their

families and/or community

4.21 Mediation is available in case of a social conflict

4.22 Fair and transparent contract farming arrangements are in place

9.4. Occupational safety and health for workers

GBEP (✓)

16. Incidence of occupational injury, illness and fatalities

RSB (GLOBAL) (✓)

(Criterion 4.f Conditions of occupational safety and health for workers shall follow internationally recognized standards)

4.f.i.1. The participating operator provides objective evidence demonstrating where applicable comprehensive and consistent compliance with the provisions of ILO convention 184.

4.f.i.3. The participating operator has a health and safety policy in place, which applies to all workers, including contractors, workers and outgrowers. (i.e. this indicator is not applicable to small operations).

4.f.i.4. Small participating operators do not need to have the procedures required in indicator 4.f.i.3. in written form, but they need to be able to demonstrate that the requirements of indicators 4.f.i.3.

SBP (✓)

2.8.1. The BP has control systems and procedures for verifying that appropriate safeguards are put in place to protect the health and safety of forest workers (CPET S12)

RSPO RED(✓)

The health and safety plan shall cover the following:

4.7.1 (M) A health and safety policy shall be in place. A health and safety plan covering all activities shall be documented and implemented, and its effectiveness monitored.

4.7.2 (M) All operations where health and safety is an issue shall be risk assessed, and procedures and actions shall be documented and implemented to address the identified issues. All precautions attached to products shall be properly observed and applied to the workers.

4.7.3 (M) All workers involved in the operation shall be adequately trained in safe working practices. Adequate and appropriate protective equipment shall be available to all

workers at the place of work to cover all potentially hazardous operations, such as pesticide application, machine operations, and land preparation, harvesting and, if it is used, burning.

4.7.4 (M) The responsible person/persons shall be identified. There shall be records of regular meetings between the responsible person/s and workers. Concerns of all

parties about health, safety and welfare shall be discussed at these meetings, and any issues raised shall be recorded.

4.7.5 Accident and emergency procedures shall exist and instructions shall be clearly understood by all workers. Accident procedures shall be available in the appropriate language of the workforce. Assigned operatives trained in First Aid should be present in both field and other operations, and first aid equipment shall be available at worksites. Records of all accidents shall be kept and periodically reviewed.

4.7.6 All workers shall be provided with medical care, and covered by accident insurance.

4.7.7 Occupational injuries shall be recorded using Lost Time Accident (LTA) metrics

RTRS EU RED (✓)

2.3.1 Producers and their employees demonstrate an awareness and understanding of health and safety matters.

2.3.2 Relevant health and safety risks are identified, procedures are developed to address these risks by employers, and these are monitored.

2.3.3 Potentially hazardous tasks are only carried out by capable and competent people who do not face specific health risks.

2.3.4 Adequate and appropriate protective equipment and clothing is provided and used in all potentially hazardous operations such as pesticide handling and application and mechanized or manual operations.

2.3.5 There is a system of warnings followed by legally-permitted sanctions for workers that do not apply safety requirements.

2.3.6 Accident and emergency procedures exist and instructions are clearly understood by all workers.

2.3.7 In case of accidents or illness, access to first aid and medical assistance is provided without delay.

Bonsucro EU (✓)

2.2.2. Main health and safety risks are assessed and measures for mitigation of risk are implemented

Greenergy (✓)

16.7.1 All workers receive regular and adequate health and safety training appropriate to the work that they perform.

16.7.2 Workers' basic requirements are met including potable drinking water, adequate toilet facilities, a clean place to eat, adequate protective equipment and access to adequate and accessible (physically and financially) medical care. Accommodation, where provided, shall be clean, safe and meet the basic needs of the workers.

16.7.3 Hazards are identified and workers informed and adopt preventive measures to minimise risks. Records of accidents are maintained.

ISCC-EU (✓)

(Criterion 3.1 Safe Working Conditions)

3.1.1 The farm has a written health, safety and hygiene policy and procedures including issues of risk assessment

3.1.2 First Aid kits are present at all permanent sites and in the vicinity of fieldwork

3.1.3 Workers (including subcontractors) are equipped with suitable protective clothing in accordance with legal requirements and/or label instructions or as authorised by a competent authority. Protective clothing is cleaned after use and stored so as to prevent contamination of clothing or equipment

3.1.4 Potential hazards are clearly identified by warning signs and placed where appropriate

3.1.5 There are records kept for training activities and attendees

3.1.6 All workers handling and/or administering chemicals, disinfectants, plant protection products, biocides or other hazardous substances and all workers operating dangerous or complex equipment as defined in the risk assessment have certificates of competence, and/or details of other such qualifications

3.1.7 All workers received adequate health and safety training and have been instructed according to the risk assessment

3.1.8 Workers have access to clean food storage areas, designated dining areas, hand washing facilities and drinking water

3.1.9 On site living quarters are habitable and have the basic services and facilities

10. Health risks

10.1. Risks to public health

GBEP (✓)

15. Change in mortality and burden of disease attributable to indoor smoke

RED (~)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Public health, animal health and plant health. Food safety

RSB (GLOBAL) (✓)

(Criterion 11a. Information on the use of technologies in biofuel operations shall be fully available, unless limited by national law or international agreements on intellectual property)

11.a.i.2. The participating operator provides documented evidence demonstrating that disclosure of information includes at minimum the actual or potential risks identified, and any actual or potential impacts on human health and the environment.

11.d.i.6. The participating operator provides objective evidence that chemicals are disposed, recycled or destroyed in a manner that minimizes the risk of accidents and potential negative impacts on human health and on the environment.

RTRS EU RED (✓)

(Criterion 5.9 Appropriate measures are implemented to prevent the drift of agrochemicals to neighbouring areas)

5.9.1 There are documented procedures in place that specify good agricultural practices, including minimization of drift, in applying agrochemicals and these procedures are being implemented.

5.9.2 Records of weather conditions (wind speed and direction, temperature and relative humidity) during spraying operations are maintained.

5.9.3 Aerial application of pesticides is carried out in such a way that it does not have an impact on populated areas. All aerial application is preceded by advance notification to residents within 500m of the planned application.

5.9.4 There is no aerial application of pesticides in WHO Class Ia, Ib and II within 500m of populated areas or water bodies.

5.9.5 There is no application of pesticides within 30m of any populated areas or water bodies.

ISCC-EU (✓)

2.8.10 Application of plant protection products is done appropriately

If plant protection products are applied near populated areas or water bodies, appropriate distances must be kept. If plant protection products are applied aurally, any residents within 500 m of the planned application are notified in advance. Pesticides classified as WHO1a, 1b or 2 are not applied within a 500 m distance to any populated areas or water bodies.

During plant protection product application the weather conditions (e.g. wind speed, wind direction, temperature) are examined and taken into account in order to minimize drift. Documented procedures on good agricultural practices during spraying and records of weather conditions shall be available.

11. Food security

11.1 Risks for negative impacts on price and supply of national food basket and fuelwood.

GBEP (✓)

10. Price and supply of a national food basket

RSB (GLOBAL) (✓)

6.a.i.1. The participating operator provides objective evidence demonstrating whether the biomass/biofuels operation(s) is/are in a region which is at risk of food insecurity, in accordance with the RSB screening exercise.

In regions where food security has been identified as a risk during the RSB screening exercise:

6.a.i.2. The participating operator provides objective evidence demonstrating that an assessment of the status of food security in the region has been undertaken including the assessment of access, availability, stability and utilization of food.

6.a.i.3. The participating operator provides objective evidence demonstrating that the methodology used for assessment of the status of food security in the region provides results equivalent to the RSB Food Security Assessment Guidelines (RSB-GUI-006-01).

6.a.i.4. The participating operator provides objective evidence demonstrating that an assessment of the impacts of her/his/its biomass/biofuels operation(s) on food security in the region in accordance with the RSB Food Security Assessment Guidelines (RSB-GUI-006-01) was carried out, including an assessment of potential positive and negative impacts and impacts on local economic development.

6.a.i.5. The participating operator provides objective evidence demonstrating that in cases where her/his/its biomass/biofuels operation(s) actually or possibly result in negative impact(s) on food security in the region, the corresponding management plan has been adapted to mitigate such negative impacts.

6.a.i.6. The participating operator provides objective evidence demonstrating that the implementation of the relevant management plan ensures that impacts on food security are minimized and mitigated, and that access, availability, stability and utilization of food at the local level do not decrease as a result of her/his/its biomass/biofuels operation(s).

6.b.i.1. The participating operator provides objective evidence demonstrating that measures are implemented to enhance food security of directly affected stakeholders.

6.b.i.2. The participating operator provides objective evidence demonstrating that the effectiveness of the measures to enhance food security of directly affected stakeholders is monitored.

6.b.i.3. The participating operator maintains records of all activities designed to enhance local food security (as prescribed in indicator 6.b.i.1.) including the type of activity, number of people/organizations affected and monetary value of the implemented measures.

SBP (✓)

2.5.2. The BP has control systems and procedures for verifying that production of feedstock does not endanger food, water supply or subsistence means of

communities, where the use of this specific feedstock or water is essential for the fulfillment of basic needs.

ISCC-EU (✓)

4.23 Biomass production does not impair food security

Biomass production shall not replace stable crops or impair the local food security. Where local food prices are expected to rise as a direct effect of biomass production, the producer shall set up mitigation measures.

GGL-Agri (✓)

1.5 Storage and distribution problems, affecting food availability are identified and dealt with in the management plan.

12. Production costs

12.1 Levelized life-cycle cost, excluding subsidies (including CAPEX, OPEX)

GBEP (✓)

17. Productivity:

- Productivity of bioenergy feedstocks by feedstock or by farm/plantation
- Processing efficiencies by technology and feedstock
- Amount of bioenergy end product by mass, volume or energy content per hectare per year
- Production cost per unit of bioenergy

Annex 2. FRAMEWORK INDICATORS

2.1. Forest schemes

Table 4 Benchmark and Gap Analysis of the selected Forest Schemes against the identified Framework Indicators

S2Biom related Theme (T) or Criterion (C)	Framework topics	#	Framework indicators	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal	
All	Compliance with laws	1	Compliance with the applicable, laws, international conventions and obligatory codes of practice	✓	✓							~	~			~		
All		2	Avoidance of illegal activities	✓	✓													
All	Governance	3	Continual improvement		✓													
All		4	Product or benefits diversification	✓	✓	✓	✓	✓	✓				✓	✓	✓		~	✓
All	Planning and Monitoring	5	Consider other functions of forests than productive ones	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
All		6	Risk assessment/management	✓	~		~		~	~						~	~	
All		7	Social and Environment Impact assessment	✓	✓													

S2Biom related Theme (T) or Criterion (C)	Framework topics	#	Framework indicators	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal	
All		8	Avoid and mitigate negative impacts and promote positive ones	✓	✓													
All		9	Management plan	✓	✓		✓	~	✓	✓	✓	✓	✓	✓	✓	✓		
All		10	Apply precautionary approach	✓	✓													
All		11	Identify and analyse potential emergencies															
All		12	Planning and management at the landscape level	✓	✓												~	
All		13	Connectivity, fragmentation, forest encroachment	✓	✓		✓		✓				✓	✓	✓	✓		✓
T1: Environment		14	To implement adaptive management	✓	✓		✓		✓		✓							✓
All		15	Monitor production and process efficiency; to measure the impacts of production and processing															
All	Technology	16	Technological inputs					✓		✓							✓	

S2Biom related Theme (T) or Criterion (C)	Framework topics	#	Framework indicators	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal
All		17	Transfer of technology					✓		✓		✓	✓	✓	✓		
All		18	Environmentally friendly technologies			✓	~		~								

FW 1. Compliance with the applicable, laws, international conventions and obligatory codes of practice

FSC (✓)

1.5 The Organization shall comply with the applicable national laws, local laws, ratified international conventions and obligatory codes of practice, relating to the transportation and trade of forest products within and from the Management Unit, and/or up to the point of first sale.

PEFC (✓)

5.7.1 Forest management shall comply with legislation applicable to forest management issues including forest management practices; nature and environmental protection; protected and endangered species; property, tenure and land-use rights for indigenous people; health, labour and safety issues; and the payment of royalties and taxes.

CILSS (~)

7.3 Institutional, human and financial capacity to implement the national forestry policy, and relevant national and international laws, instruments and regulations

SADC (~)

7.3 Existence of institutional, human and financial capacity to implement the national forestry policy, and relevant national and international laws, instruments and regulations

MCFPE (~)

A.3 Legal/regulatory frameworks and international commitments.

FW 2. Avoidance of illegal activities

FSC (✓)

1.4 The Organization shall develop and implement measures, and/or shall engage with regulatory agencies, to systematically protect the Management Unit from unauthorized or illegal resource use, settlement and other illegal activities.

PEFC (✓)

5.7.2 Forest management shall provide for adequate protection of the forest from unauthorised activities such as illegal logging, illegal land use, illegally initiated fires, and other illegal activities.

FW 3. Continual improvement

PEFC (✓)

5.1.2 Forest management shall comprise the cycle of inventory and planning, implementation, monitoring and evaluation, and shall include an appropriate assessment of the social, environmental and economic impacts of forest management operations. This shall form a basis for a cycle of continuous improvement to minimise or avoid negative impacts.

FW 4. Product or Benefits Diversification

FSC (✓)

5.1 The Organization shall identify, produce, or enable the production of, diversified benefits and/or products, based on the range of resources and ecosystem services existing in the Management Unit in order to strengthen and diversify the local economy proportionate to the scale and intensity of management activities.

PEFC (✓)

5.3.1 Forest management planning shall aim to maintain the capability of forests to produce a range of wood and non-wood forest products and services on a sustainable basis.

5.3.3 Forest management plans or their equivalents shall **take** into account the different uses or functions of the managed forest area. Forest management planning shall make use of those policy instruments set up to support the production of commercial and non-commercial forest goods and services.

5.3.4 Forest management practices shall maintain and improve the forest resources and encourage a diversified output of goods and services over the long term.

5.3.6 Harvesting levels of both wood and non-wood forest products shall not exceed a rate that can be sustained in the long term, and optimum use shall be made of the harvested forest products, with due regard to nutrient off-take.

Tarapoto FMU (✓)

9.1 Annual extraction of timber and non-timber forest products compatible with the sustainability capacity of the resource base.

9.4 Degree of diversification of production.

ITTO FMU (✓)

4.2. Actual and sustainable harvest of wood and non-wood forest products

Tarapoto CL (✓)

3.5 Level of diversification of sustainable forest production.

ITTO CL (✓)

4.2. Actual and sustainable harvest of wood and non-wood forest product

CILSS (✓)

4.5 Managed and sustainable extraction of non-wood forest products (and its change over time), incl.: fodder (grass layer and fodder from trees/shrubs), consumptive wildlife utilisation, honey, gum, misc. fruits, roots, edible leaves, medicinal substances, fibres for handicrafts etc.

SADC (✓)

4.5 Managed and sustainable extraction of non-wood forest products of:

- fodder (grass layer and fodder from trees/shrubs)
- consumptive wildlife utilisation
- honey, gum
- miscellaneous fruits, roots, edible leaves and mushrooms etc
- medicinal substances
- fibres for handicrafts and other uses

Lepaterique CL (✓)

6.5. Diversification of products from the forest: wood and non-wood products

MCFPE (~)

3.2 Roundwood Value and quantity of marketed roundwood

3.3 Non-wood goods Value and quantity of marketed non-wood goods from forest and other wooded land

3.4 Services Value of marketed services on forest and other wooded land

Montreal Process (✓)

6.1.b Value of non-wood forest products produced or collected

FW 5. Consider other functions of forests than productive ones

FSC (✓)

5.1 The Organization shall identify, produce, or enable the production of, diversified benefits and/or products, based on the range of resources and ecosystem services existing in the Management Unit in order to strengthen and diversify the local economy proportionate to the scale and intensity of management activities.

6.3 The Organization shall identify and implement effective actions to prevent negative impacts of management activities on the environmental values, and to mitigate and repair those that occur, proportionate to the scale, intensity and risk of these impacts

PEFC (✓)

5.6.5 Adequate public access to forests for the purpose of recreation shall be provided taking into account respect for ownership rights and the rights of others, the effects on forest resources and ecosystems, as well as compatibility with other functions of the forest.

5.6.7 Forest management operations shall take into account all socio-economic functions, especially the recreational function and aesthetic values of forests by maintaining for example varied forest structures, and by encouraging attractive trees, groves and other features such as colours, flowers and fruits. This shall be done, however, in a way and to an extent that does not lead to serious negative effects on forest resources, and forest land.

ITTO FMU (✓)

7.10. Number and extent of forest sites available primarily for:

(a) research and education; and

(b) recreation

Tarapoto CL (✓)

3.4 Area and percentage of forest lands managed for recreation and tourism, in relation to total forest area.

ITTO CL (✓)

7.10. Number and extent of forest sites available primarily for:

(a) research and education; and

(b) recreation

ASI (✓)

7.2 Level of recreation, cultural, religious and aesthetic needs

CILSS (✓)

5.3 Areas of forests and other wooded lands managed for scenic and amenity purposes

SADC (✓)

5.4 Areas of forests and other wooded lands managed for scenic and amenity purposes

Lepaterique CL (✓)

4.2. Area and percentage of forests managed for recreation and tourism in relation to the total national land area.

Near East Process (✓)

5.3 Areas managed for scenic and amenity purposes

MCFPE (✓)

6.10 Accessibility for recreation Area of forest and other wooded land where public has a right of access for recreational purposes and indication of intensity of use

Montreal Process (✓)

6.4.a Area and percent of forests available and/or managed for public recreation and tourism

6.4.b Number, type, and geographic distribution of visits attributed to recreation and tourism and related to facilities available.

FW 6. Risk assessment/management

FSC (✓)

10.9 The Organization shall assess risks and implement activities that reduce potential negative impacts from natural hazards proportionate to scale, intensity, and risk.

PEFC (~)

5.2.3 The monitoring and maintaining of health and vitality of forest ecosystems shall take into consideration the effects of naturally occurring fire, pests and other disturbances

ITTO FMU (~)

3.2. Extent and nature of forest degradation and disturbance due to natural causes and the control procedures applied

ITTO CL (~)

3.2. Extent and nature of forest degradation and disturbance due to natural causes and the control procedures applied

ASI (~)

2.4 Extent of forest area affected by: grazing, fire, storms, floods, droughts, wind

Near East Process (~)

3.1 Areas and percentage of forest (plantations/natural forests) affected by:

- natural fires
- storms
- insects and diseases
- drought
- wild animals (game)

MCFPE (~)

2.4 Forest damage Forest and other wooded land with damage, classified by primary damaging agent (abiotic, biotic and human induced) and by forest type.

FW 7. Social and Environment Impact assessment

FSC (✓)

6.3 The Organization shall identify and implement effective actions to prevent negative impacts of management activities on the environmental values, and to mitigate and repair those that occur, proportionate to the scale, intensity and risk of these impacts.

PEFC (✓)

5.1.2 Forest management shall comprise the cycle of inventory and planning, implementation, monitoring and evaluation, and shall include an appropriate assessment of the social, environmental and economic impacts of forest management operations. This shall form a basis for a cycle of continuous improvement to minimise or avoid negative impacts.

FW 8. Avoid and mitigate negative impacts and promote positive ones

FSC (✓)

4.5 The Organization, through engagement with local communities, shall take action to identify, avoid and mitigate significant negative social, environmental and economic impacts of its management activities on affected communities. The action taken shall be proportionate to the scale, intensity and risk of those activities and negative impacts.

6.3 The Organization shall identify and implement effective actions to prevent negative impacts of management activities on the environmental values, and to mitigate and repair those that occur, proportionate to the scale, intensity and risk of these impacts.

PEFC (✓)

5.1.2 Forest management shall comprise the cycle of inventory and planning, implementation, monitoring and evaluation, and shall include an appropriate assessment of the social, environmental and economic impacts of forest management operations. This shall form a basis for a cycle of continuous improvement to minimise or avoid negative impacts

5.3.8 Adequate infrastructure such as roads, skid tracks or bridges shall be planned, established and maintained to ensure efficient delivery of goods and services while minimising negative impacts on the environment.

FW 9. Management plan

FSC (✓)

7.2 The Organization shall have and implement a management plan for the Management Unit which is fully consistent with the policies and objectives as established according to Criterion 7.1. The management plan shall describe the natural resources that exist in the Management Unit and explain how the plan will meet the FSC certification requirements. The management plan shall cover forest management planning and social management planning proportionate to scale, intensity and risk of the planned activities.

PEFC (✓)

5.1.4 Management plans or their equivalents, appropriate to the size and use of the forest area, shall be elaborated and periodically updated. They shall be based on legislation as well as existing land-use plans, and adequately cover the forest resources

ITTO FMU (✓)

1.11. Existence of forest management plans

Tarapoto CL (~)

3.1 Extension and proportion of forest lands and forests dedicated to sustainable production in relation to the total permanent production area.

ITTO CL (✓)

1.11. Existence of forest management plans

ASI (✓)

5.1 The extent of forest area under forest management plans

ATO (✓)

II.1.1. There is a management plan comprising:

- definition of the forest area subjected to sustainable management;

- key findings of studies and analyses on all the functions and uses of the forest (timber production, other forest products, farmer-forest relationship, forest ecosystem);
- definition of objectives in these various uses, their spatial organization and their hierarchy;
- relevant action plans to meet these objectives;
- reference to laws and regulations governing such actions (particularly the national directives on management);
- economic and financial evaluation;
- a set of maps allowing a clear summarized overview of the results of studies (vegetation map, forest settlement map, etc.), the objectives (map of working circles) and the action plans (map of blocks for harvesting, coupes, replanting, etc.).

CILSS (✓)

4.1 Percentage of forests and other wooded lands managed according to a management plan

SADC (✓)

4.1 Percentage of forests and other wooded lands managed according to a management plan

Lepaterique CL (✓)

6.1. Forest area under management through the implantation of legally authorized management plans.

Near East Process (✓)

1.3 Area and percentage of forests for which management plans are made

4.1 Percentage of forests and other wooded lands managed according to an integrated management plan

MCFPE (✓)

3.5 Forests under management plans. Proportion of forest and other wooded land under a management plan or equivalent

FW 10. Apply precautionary approach

FSC (✓)

(Principle 9: High Conservation Values. The Organization shall maintain and/or enhance the High Conservation Values in the Management Unit through applying the precautionary approach)

9.1 The Organization, through engagement with affected stakeholders, interested stakeholders and other means and sources, shall assess and record the presence and status of the following High Conservation Values in the Management Unit, proportionate to the scale, intensity and risk of impacts of management activities, and likelihood of the occurrence of the High Conservation Values: (...)

9.2 The Organization shall develop effective strategies that maintain and/or enhance the identified High Conservation Values, through engagement with affected stakeholders, interested stakeholders and experts.

9.3 The Organization shall implement strategies and actions that maintain and/or enhance the identified High Conservation Values. These strategies and actions shall implement the precautionary approach and be proportionate to the scale, intensity and risk of management activities.

9.4 The Organization shall demonstrate that periodic monitoring is carried out to assess changes in the status of High Conservation Values, and shall adapt its management strategies to ensure their effective protection. The monitoring shall be proportionate to the scale, intensity and risk of management activities, and shall include engagement with affected stakeholders, interested stakeholders and experts.

PEFC (✓)

5.4.7 Genetically-modified trees shall not be used. Note: The restriction on the usage of genetically-modified trees has been adopted based on the Precautionary Principle. Until enough scientific data on genetically-modified trees indicates that impacts on human and animal health and the environment are equivalent to, or more positive than, those presented by trees genetically improved by traditional methods, no genetically-modified trees will be used.

FW 12. Planning and management at the landscape level

FSC (✓)

6.8 The Organization shall manage the landscape in the Management Unit to maintain and/or restore a varying mosaic of species, sizes, ages, spatial scales and regeneration cycles appropriate for the landscape values in that region, and for enhancing environmental and economic resilience.

9.1 The Organization, through engagement with affected stakeholders, interested stakeholders and other means and sources, shall assess and record the presence and status of the following High Conservation Values in the Management Unit, proportionate to the scale, intensity and risk of impacts of management activities, and likelihood of the occurrence of the High Conservation Values: (...)

PEFC (✓)

5.4.8 Forest management practices shall, where appropriate, promote a diversity of both horizontal and vertical structures such as uneven-aged stands and the diversity of species such as mixed stands. Where appropriate, the practices shall also aim to maintain and restore landscape diversity

MCFPE (~)

4.7 Landscape pattern Landscape-level spatial pattern of forest cover.

FW 13. Connectivity, fragmentation, forest encroachment

FSC (✓)

6.4 The Organization shall protect rare species and threatened species and their habitats in the Management Unit through conservation zones, protection areas, connectivity and/or (where necessary) other direct measures for their survival and viability. These measures shall be proportionate to the scale, intensity and risk of management activities and to the conservation status and ecological requirements of the rare and threatened species.

The Organization shall take into account the geographic range and ecological requirements of rare and threatened species beyond the boundary of the Management Unit, when determining the measures to be taken inside the Management Unit.

PEFC (✓)

5.4.6 Afforestation and reforestation activities that contribute to the improvement and restoration of ecological connectivity shall be promoted.

ITTO FMU (✓)

3.1. Extent and nature of forest encroachment, degradation and disturbance caused by humans and the control procedures applied

ITTO CL (✓)

3.1. Extent and nature of forest encroachment, degradation and disturbance caused by humans and the control procedures applied

5.2. Protected areas connected by biological corridors or 'stepping stones'

CILSS (✓)

2.3 Fragmentation of forests

3.4 Bush encroachment

SADC (✓)

3.4 Encroachment by invasive plants

3.6 Percentage of forest area encroached by human activities

Lepaterique CL (✓)

5.4. Area and length of Biological Corridors per forest ecosystem.

Near East Process (✓)

2.3 Spatial fragmentation of forest resources

3.4 Area of encroachment for farming, urban expansion and unplanned tourism

Montreal Process (✓)

1.1.c Fragmentation of forests.

FW 14. To implement adaptive management**FSC (✓)**

8.1 The Organization shall monitor the implementation of its management plan, including its policies and objectives, its progress with the activities planned, and the achievement of its verifiable targets.

8.2 The Organization shall monitor and evaluate the environmental and social impacts of the activities carried out in the Management Unit, and changes in its environmental condition.

8.3 The Organization shall analyze the results of monitoring and evaluation and feed the outcomes of this analysis back into the planning process.

PEFC (✓)

5.1.2 Forest management shall comprise the cycle of inventory and planning, implementation, monitoring and evaluation, and shall include an appropriate assessment of the social, environmental and economic impacts of forest management operations. This shall form a basis for a cycle of continuous improvement to minimise or avoid negative impacts.

5.1.7 Monitoring of forest resources and evaluation of their management shall be periodically performed, and results fed back into the planning process.

ITTO FMU (✓)

1.9. Capacity and mechanisms for planning sustainable forest management and for periodic monitoring, evaluation and feedback on progress

ITTO CL (✓)

1.9. Capacity and mechanisms for planning sustainable forest management and for periodic monitoring, evaluation and feedback on progress

ATO (✓)

II.1.4. The follow-up and the control of the implementation of the management plan are done on the basis of the information included in the appropriate documents

Montreal Process (✓)

7.5.c Monitoring, assessment and reporting on progress towards sustainable management of forests.

FW 16. Technological inputs

Tarapoto CL (✓)

6.1 Quantity and quality of adequate technology for forest management and sustainable production.

ASI (✓)

5.6 Degree of technological inputs

Montreal Process (✓)

7.4.b Development and application of research and technologies for the sustainable management of forests.

FW 17. Transfer of technology**Tarapoto CL (✓)**

6.3 Investment in research, education and technology transfer.

ASI (✓)

8.8 Existence of transfer of technology

CILSS (✓)

7.7. Existence of measures to facilitate the transfer and adaptation of appropriate technologies.

SADC (✓)

7.7 Existence of measures to facilitate the transfer and adaptation of appropriate technologies

Lepaterique CL (✓)

7.3. Investment in forestry research, training and education and in technology transfer.

Near East Process (✓)

7.8 Transfer and adaptation of appropriate technologies

FW 18. Environmentally friendly technologies**Tarapoto FMU (✓)**

9.5 Degree of utilization of environmentally friendly technologies.

ITTO FMU (~)

1.8. Existence of, and ability to apply, appropriate technology to practise sustainable forest management and the efficient utilization and marketing of forest products

ITTO CL (~)

1.8. Existence of, and ability to apply, appropriate technology to practise sustainable forest management and the efficient utilization and marketing of forest products.

2.2. Agricultural schemes

In Table 5 the benchmark and gap analysis of the selected agricultural schemes against the identified Framework indicators is shown.

Table 5 *Benchmark and Gap Analysis of the selected Agriculture Schemes against the identified Framework Indicators*

S2Biom related Theme (T) or Criterion (C)	Framework topics	#	Framework Indicators	SAFA	SAN	RSPO	RTRS	Bonsucro	CAP
All	Compliance with laws	1	Compliance with the applicable, laws, international conventions and obligatory codes of practice	✓	✓	✓	✓	✓	
All		2	Avoidance of illegal activities			✓			
All	Governance	3	Continual improvement	✓	✓	✓	✓	✓	
All		4	Product or benefits diversification	✓	✓				
All	Planning and Monitoring	5	Consider other functions of forests than productive ones						
All		6	Risk assessment/management	✓	✓	✓	✓	✓	
All		7	Social and Environment Impact assessment	~		✓	✓	✓	
All		8	Avoid and mitigate negative impacts and promote positive ones	~		✓	✓	~	
All		9	Management plan	✓	✓	✓	~	~	
All		10	Apply precautionary approach	~					
All		11	Identify and analyse potential emergencies	~	✓	✓	✓	✓	
All		12	Planning and management at the landscape level	✓	~	✓			✓
All		13	Connectivity, fragmentation, forest encroachment	~	✓	✓			

S2Biom related Theme (T) or Criterion (C)	Framework topics	#	Framework Indicators	SAFA	SAN	RSPO	RTRS	Bonsucro	CAP
Theme 1: Environment		14	To implement adaptive management			~			
All		15	Monitor production and process efficiency; to measure the impacts of production and processing	~	~	✓		✓	
All	Technology	16	Technological inputs		~				
All		17	Transfer of technology						
All		18	Environmentally friendly technologies						

FW 1. Compliance with all applicable local, national and ratified international laws and regulations

SAFA (✓)

G.4.1.1. Legitimacy: Operational legitimacy will firstly be judged by the enterprise's adherence to the rule of law

G.4.2.1. Remedy, Restoration and Prevention: Operational legitimacy will firstly be judged by the enterprises' adherence to the rule of law and its ability to promptly remedy any breach, restore or compensate the effects of any breach, and put in place mechanisms to prevent any future breach

SAN (✓)

1.1. The farm must have a social and environmental management system according to its size and complexity of its operations that contains the necessary policies, programs and procedures that prove compliance with this standard and respective national legislation binding for social, labour and environmental aspects on farms – whichever is stricter.

RSPO (✓)

(Criterion 2.1. There is compliance with all applicable local, national and ratified international laws and regulations)

2.1.1 (M) Evidence of compliance with relevant legal requirements shall be available.

2.1.2 A documented system, which includes written information on legal requirements, shall be maintained.

2.1.3 A mechanism for ensuring compliance shall be implemented.

2.1.4 A system for tracking any changes in the law shall be implemented.

RTRS (✓)

(1.1 There is awareness of, and compliance with, all applicable local and national legislation)

1.1.1 Awareness of responsibilities, according to applicable laws can be demonstrated.

1.1.2 Applicable laws are being complied with.

Bonsucro (✓)

(Criterion 1.1. To comply with applicable laws)

1.1.1. National laws complied with.

FW 2. Avoidance of illegal activities

RSPO (✓)

5.2.2 (M) Where rare, threatened or endangered (RTE) species, or HCVs, are present or are affected by plantation or mill operations, appropriate measures that are expected to maintain and/or enhance them shall be implemented through a management plan. Specific guidance: These measures will include: (...)

Controlling any illegal or inappropriate hunting, fishing or collecting activities, and developing responsible measures to resolve human-wildlife conflicts (e.g. incursions by elephants).

FW 3. Continual improvement

SAFA (✓)

G.2.2.1. Responsibility: Responsibility for impact is inextricably linked to sustainable performance. Implicit in this, is the understanding of governance-driven continuous improvement. Improvements in the sustainable practice of organizations are achieved through cycles of continuous action and reflection.

SAN (✓)

1.7. The farm must have the necessary processes for follow up, measurement and analysis, including that of claims by workers or other persons or groups, to evaluate the functioning of the social and environmental management system and farm compliance with applicable laws and the standard. The results of these processes must be recorded and incorporated into the social and environmental management system through a continual improvement plan and program. The continual improvement program must include the necessary corrective actions to rectify non-compliance situations, as well as the mechanisms needed to determine if the actions are implemented and if they result in improvements or need to be adjusted to produce the desired results.

RSPO (✓)

8.1.1 (M) The action plan for continual improvement shall be implemented, based on a consideration of the main social and environmental impacts and opportunities of the grower/mill, and shall include a range of Indicators covered by these Principles and Criteria.

(Criterion 5.1. Aspects of plantation and mill management, including replanting, that have environmental impacts are identified, and plans to mitigate the negative impacts and promote the positive ones are made, implemented and monitored, to demonstrate continual improvement)

RTRS (✓)

1.3.1 A review process is carried out which identifies those social, environmental and agricultural aspects of the operation (on and off farm) where improvement is desirable.

Note: The producer is expected to be aware of the social and environmental context in which he/she is operating and the existing and possible future impacts of the operation.

1.3.2 A number of indicators are selected and a baseline is established to be able to monitor continual improvement on those aspects where desired improvements have been identified.

Note: Producers are free to choose the continual improvement indicators that are relevant to them to demonstrate continual improvement with respect to the requirements of this standard; e.g. Soil carbon content, use of agrochemicals, state of riparian vegetation etc. The baseline year is the year of first certification assessment.

1.3.3 The results of monitoring are reviewed and appropriate action is planned and taken when necessary to ensure continual improvement.

Bonsucro (✓)

(Criterion 3.1 To monitor production and process efficiency; to measure the impacts of production and processing so that improvements are made over time)

Principle 5. Continuously improve key areas of the business

(Criterion 5.2 To continuously improve the status of soil and water resources)

(Criterion 5.3 To continuously improve the quality of sugarcane and products from the sugar mill).

FW 4. Product or Benefits Diversification

SAFA (✓)

C.2.1.2. Product Diversification: Product diversification refers to the process through which the enterprise diversifies or expands beyond its product range by modifying existing products, or adding new products. For smallholder farmers, it enables a better use of land through crop rotation and the production of several crops and species simultaneously.

C.2.3.1. Stability of Market: This indicator measures the extent to which the enterprise has guaranteed its stability in the market through the implementation of actions and mechanisms to ensure a diversified and consolidated income structure from the product' sales.

SAN (✓)

(Criterion 2. Ecosystem conservation. (...) The Sustainable Agriculture Network recognizes that forests and farms are potential sources of timber and non-timber forest products that help to diversify farm income when they are managed in a sustainable manner).

FW 6. Risk adaptation and mitigation plan

SAFA (✓)

C.2.5.1. Risk Management

SAN (✓)

6.1. The farm must have an occupational health and safety program with the principal objective being to identify and minimize or eliminate workers' occupational risks. The program must have the policies, procedures, personnel and the resources necessary for reaching its objectives. It must also comply with applicable national laws and with this standard and be known and understood by the workers. The workers must be involved with reviewing the policies, procedures and other activities indicated in the program to ensure compliance. An occupational health committee must be established on farms with ten or more permanent production and processing workers. A written procedure is required for selecting committee members, and records must be kept for committee meetings and actions taken.

RSPO (✓)

4.7.2. (M) All operations where health and safety is an issue shall be risk assessed, and procedures and actions shall be documented and implemented to address the identified issues. All precautions attached to products shall be properly observed and applied to the workers.

RTRS (✓)

2.3.2 Relevant health and safety risks are identified, procedures are developed to address these risks by employers, and these are monitored.

4.1.1. A social and environmental assessment is carried out prior to the establishment of large or high risk new infrastructure

Bonsucro (✓)

2.2.2. Main health and safety risks are assessed and measures for mitigation of risk are implemented

FW 7. Social and environmental impact assessment

SAFA (~)

G.3.1.4. Effective Participation: The impact assessment of stakeholder participation is necessarily qualitative. While we can measure the number of stakeholder views incorporated, the true measure of performance is really how great the impact has been.

RSPO (✓)

5.1.1 (M) An environmental impact assessment (EIA) shall be documented.

(Criterion 7.1. A comprehensive and participatory independent social and environmental impact assessment is undertaken prior to establishing new plantings or operations, or expanding existing ones, and the results incorporated into planning, management and operations)

7.1.1 (M) An independent social and environmental impact assessment (SEIA), undertaken through a participatory methodology including the relevant affected stakeholders, shall be documented.

RTRS (✓)

(Criterion 4.1. On and off site social and environmental impacts of large or high risk new infrastructure have been assessed and appropriate measures taken to minimize and mitigate any negative impacts)

4.1.1. A social and environmental assessment is carried out prior to the establishment of large or high risk new infrastructure

Bonsucro (✓)

4.1.3. The key environmental issues are covered by an appropriate and implemented environmental impact and management plan (EIMP)

(Criterion 5.7. For greenfield expansion or new sugarcane projects, to ensure transparent, consultative and participatory processes that address cumulative and induced effects via an environmental and social impact assessment (ESIA))

5.7.1. Percentage of greenfield expansion or new sugarcane project covered by ESIA

FW 8. Avoid and mitigate negative impacts and promote positive ones

SAFA (~)

G.1.2.1. Due Diligence. (...) The enterprise has accomplished all components of appropriate risk assessment, which includes internal and external risks, as well as external impacts on others in all areas of sustainability. Also, the enterprise has not experienced any major losses or caused major negative impacts as a result of unmitigated risks.

RSPO (✓)

(Criterion 5.1. Aspects of plantation and mill management, including replanting, that have environmental impacts are identified, and plans to mitigate the negative

impacts and promote the positive ones are made, implemented and monitored, to demonstrate continual improvement)

(Criterion 6.1. Aspects of plantation and mill management that have social impacts, including replanting, are identified in a participatory way, and plans to mitigate the negative impacts and promote the positive ones are made, implemented and monitored, to demonstrate continual improvement)

RTRS (✓)

(Criterion 4.1 On and off site social and environmental impacts of large or high risk new infrastructure have been assessed and appropriate measures taken to minimize and mitigate any negative impacts)

4.1.4 Measures to minimize or mitigate the impacts identified by the assessment are documented and are being implemented

4.3.3 Soil organic matter is monitored to quantify change in soil carbon and steps are taken to mitigate negative trends.

(Criterion 5.4 Negative environmental and health impacts of phytosanitary products are reduced by implementation of systematic, recognized Integrated Crop Management (ICM) techniques)

Bonsucro (~)

4.1.4 Measures to minimize or mitigate the impacts identified by the assessment are documented and are being implemented.

FW 9. Management plan

SAFA (✓)

G.5.1.1. Sustainability Management Plan

C.1.3.2. Business Plan

SAN (✓)

1.1 The farm must have a social and environmental management system according to its size and complexity of its operations that contains the necessary policies, programs and procedures that prove compliance with this standard and respective national legislation binding for social, labour and environmental aspects on farms – whichever is stricter.

1.2 The farm must implement permanent or long-term activities to comply with the standard through various programs. Social and environmental management system programs must consist of the following elements:

- a. Short-, medium- and long-term objectives and goals.
- b. A list of activities to be conducted in each program, and a timeline or plan indicating when they will be implemented.
- c. Identification of the persons responsible for carrying out the activities.
- d. Policies and procedures established to guarantee efficient execution of the activities and compliance with the standard.
- e. Maps identifying the projects, infrastructure and special areas (for conservation and protection) related to the indicated activities or to the requirements of this standard.
- f. Records to demonstrate the program is functioning adequately.

RSPO (✓)

3.1.1 (M) A business or management plan (minimum three years) shall be documented that includes, where appropriate, a business case for scheme smallholders.

3.1.2 An annual replanting programme projected for a minimum of five years (but longer where necessary to reflect the management of fragile soils, see Criterion 4.3), with yearly review, shall be available.

5.1.3 This plan shall incorporate a monitoring protocol, adaptive to operational changes, which shall be implemented to monitor the effectiveness of the mitigation measures. The plan shall be reviewed as a minimum every two years to reflect the results of monitoring and where there are operational changes that may have positive and negative environmental impacts.

RTRS (~)

4.2.5 There is a residue management plan including all areas of the property.

Bonsucro (~)

4.1.3 The key environmental issues are covered by an appropriate and implemented environmental impact and management plan (EIMP)

FW 10. Apply precautionary approach

SAFA (~)

E 4.1.1. Landscape/Marine Habitat Conservation Plan. (...) Limitations: The state of knowledge about existence, abundance and geographical distribution of species is limited. It can therefore be difficult to determine which threatened species exist in an enterprise's area of influence. It is recommended to apply the precautionary principle, assuming that in regions that are known for a high species density (high number species per unit area), a conservation plan should be elaborated in any case.

FW 11. Identify and analyse potential emergencies

SAFA (~)

S.5.1.1. Safety and Health Trainings

SAN (✓)

6.18. The farm must identify and analyse the types of potential emergencies – caused by nature or humans – that could occur on the farm according to its operations and environment. The farm must have an emergency response plan with actions and documented procedures for responding to all identified emergencies. All workers must be familiar with the emergency response measures relating to their areas of work and responsibilities. The farm must have workers trained in first aid available on each shift.

RSPO (✓)

4.7.5 Accident and emergency procedures shall exist and instructions shall be clearly understood by all workers. Accident procedures shall be available in the appropriate language of the workforce. Assigned operatives trained in First Aid should be present in both field and other operations, and first aid equipment shall be available at worksites. Records of all accidents shall be kept and periodically reviewed.

RTRS (✓)

2.3.6 Accident and emergency procedures exist and instructions are clearly understood by all workers

2.3.7 In case of accidents or illness, access to first aid and medical assistance is provided without delay.

Bonsucro (✓)

2.2.1. Lost time accident frequency

2.2.6. All workers present on the field and/or mill have access to first aid and provision for emergency response.

FW 12. Maintenance at the landscape level**SAFA (✓)**

E.4.1.1. Landscape/Marine Habitat Conservation Plan.

E.4.1.2. Ecosystem Enhancing Practices: To ensure the effective conservation or improvement of complex ecosystems, including those with agricultural and/or forest components, a broad landscape approach is critical. Within this context, this indicator refers to all practices that aim at enhancing functional relationships and processes within ecosystems by different actors in agriculture-based food chains. Examples of ecosystem services that benefit and at the same time are shaped by agricultural practices are soil formation, nutrient cycling, water flow, pest regulation, pollination, water purification and climate regulation

SAN (~)

2.9. The farm must implement a plan to maintain or restore the connectivity of natural ecosystems, within its boundaries, considering the connectivity of habitats at the landscape level; e.g. through elements such as native vegetation on roadsides and along water courses or river banks, shade trees, live fences and live barriers.

RSPO (✓)

5.2.1 (M) Information shall be collated in a High Conservation Value (HCV) assessment that includes both the planted area itself and relevant wider landscape-level considerations (such as wildlife corridors).

CAP (✓)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Environment, climate change, good agricultural condition of land.

FW 13. Connectivity, fragmentation, forest encroachment**SAFA (✓)**

E.4.1.3. Structural Diversity of Ecosystems: Many ecosystem services, such as biological pest control and pollination services, depend on the movement of organisms across the agricultural landscape. Hence, the spatial structure of the landscape strongly influences the magnitude of these services to agricultural ecosystems

E.4.1.4. Ecosystem Connectivity: This indicator focuses on the share of well-connected habitats in the areas where the analysed enterprise is operating (including aquatic habitats) during the analysed timeframe

SAN (✓)

1.9. The farm must implement a plan to maintain or restore the connectivity of natural ecosystems, within its boundaries, considering the connectivity of habitats at the landscape level; e.g. through elements such as native vegetation on roadsides and along water courses or river banks, shade trees, live fences and live barriers.

RSPO (✓)

5.2.2 (M) Where rare, threatened or endangered (RTE) species, or HCVs, are present or are affected by plantation or mill operations, appropriate measures that are expected to maintain and/or enhance them shall be implemented through a management plan. These measures will include:

(...)

- Avoiding damage to and deterioration of HCV habitats such as by ensuring that HCV areas are connected, corridors are conserved, and buffer zones around HCV areas are created;

(...)

FW 14. To implement adaptive management

RSPO (~)

7.3.5 Areas required by affected communities to meet their basic needs, taking into account potential positive and negative changes in livelihood resulting from proposed operations, shall be identified in consultation with the communities and incorporated into HCV assessments and management plans (see Criterion 5.2). Specific guidance: The management plan will be adaptive to changes in HCV 5 and 6. Decisions will be made in consultation with the affected communities.

FW 15. Monitor production and process efficiency; to measure the impacts of production and processing

SAFA (✓)

E.1.1.2. Resource-efficient practices that reduce the need for fossil based fuels and for nitrogen fertilisers, or that reduce the methane emissions of ruminants, or the implementation of more efficient refrigeration technologies or technical and operational technologies to reduce freight emissions, can help reduce GHG as well.

C1.1.1. Internal Investment: This indicator measures the extent to which the enterprise has invested over the last 5 years in activities and practices to improve and monitor its social, economic, environmental and governance performance.

SAN (~)

10.6 The farm must implement practices to diminish its emissions of greenhouse gases and increase carbon dioxide sequestration. Such practices include soil cover management, planting trees and other perennial vegetation, proper sourcing and management of fertilisers and fuels, management of effluent ponds and manure, proper waste management, use of clean technologies, improvement of energy efficiency, reduction in tillage, and participation in local or regional initiatives aimed at greenhouse gas reduction and carbon dioxide sequestration.

RSPO (✓)

5.3.3. A waste management and disposal plan to avoid or reduce pollution shall be documented and implemented.

Guidance:

The waste management and disposal plan should include measures for:

- Identifying and monitoring sources of waste and pollution.
- Improving the efficiency of resource utilisation and recycling potential wastes as nutrients or converting them into value-added products (e.g. through animal feeding programmes). (...)

Bonsucro (✓)

(Criterion 3.1 To monitor production and process efficiency; to measure the impacts of production and processing so that improvements are made over time)

FW 16. Technological inputs

SAN (~)

4.1 The farm must have a water conservation program that ensures the rational use of water resources. The program activities must make use of the best available technology and resources.

2.3. Bioenergy schemes

In Table 6 the benchmark and gap analysis of the selected Bioenergy schemes against the identified Framework indicators is shown.

Table 6 *Benchmark and Gap Analysis of the selected Bioenergy Schemes against the identified Framework Indicators*

S2Biom related Theme (T) or Criterion (C)	Framework topics	#	Framework Indicators	GBEP	RED	RSB	SBP	RSPO	RTRS	Bonsucro	Greenery	ISCC-EU	GGL-Agri	GGL-Forest
All	Compliance with laws	1	Compliance with the applicable, laws, international conventions and obligatory codes of practice			✓	✓	✓	✓	✓	✓	✓		
All		2	Avoidance of illegal activities				✓	✓				✓		
All	Governance	3	Continual improvement			~		✓	✓	✓			✓	
All		4	Product or benefits diversification	✓										
All	Planning and monitoring	5	Consider other functions of forests than productive ones											
All		6	Risk assessment/management	~		✓	✓	✓	✓	✓	✓	✓		
All		7	Social and Environment Impact assessment	✓		✓		✓	✓	✓	✓	~		✓
All		8	Avoid and mitigate negative impacts and promote positive ones			~	~	✓	✓	~	~	✓		

S2Biom related Theme (T) or Criterion (C)	Framework topics	#	Framework Indicators	GBEP	RED	RSB	SBP	RSPO	RTRS	Bonsucro	Greenenergy	ISCC-EU	GGL-Agri	GGL-Forest	
All		9	Management plan			✓	~	✓	~	~	✓	~	✓	✓	
All		10	Apply precautionary approach			✓						~			
All		11	Identify and analyse potential emergencies	~		✓	~	✓	✓	✓	~	✓			
All		12	Planning and management at the landscape level	~	~			✓							
All		13	Connectivity, fragmentation, forest encroachment	~		✓		✓				✓			
Theme 1: Environment		14	To implement adaptive management					~						~	✓
All		15	Monitor production and process efficiency; to measure the impacts of production and processing						✓		✓				
All	Technology	16	Technological inputs			~									
All		17	Transfer of technology												
All		18	Environmentally friendly technologies			✓						✓			

FW 1. Compliance with all applicable local, national and ratified international laws and regulations

RSB (GLOBAL) (✓)

1.a.i.1. The participating operator provides objective evidence demonstrating compliance with the applicable national laws and regulations.

1.a.i.2. The participating operator provides objective evidence demonstrating compliance with the applicable international laws and agreements that apply to biomass/biofuels operations with regard to this standard.

SBP (✓)

1.3.1. The Biomass Producer has control systems and procedures to ensure that feedstock is in compliance with EUTR legality requirements.

RSPO RED (✓)

(Criterion 2.1. There is compliance with all applicable local, national and ratified international laws and regulations)

2.1.1 (M) Evidence of compliance with relevant legal requirements shall be available.

2.1.2 A documented system, which includes written information on legal requirements, shall be maintained.

2.1.3 A mechanism for ensuring compliance shall be implemented.

2.1.4 A system for tracking any changes in the law shall be implemented.

RTRS EU RED (✓)

(1.1 There is awareness of, and compliance with, all applicable local and national legislation)

1.1.1 Awareness of responsibilities, according to applicable laws can be demonstrated.

1.1.2 Applicable laws are being complied with.

Bonsucro EU (✓)

(Criterion 1.1 To comply with applicable laws)

1.1.1. National laws complied with

Greenergy (✓)

12.1.1 No evidence of noncompliance with applicable national and local laws, decrees and regulations including:

- Land ownership and land use rights
- Forest and plantation management
- Protected and gazetted areas
- Nature and wild life conservation
- Land use planning
- National laws resulting from the adoption of CBD and CITES

12.1.2 Evidence that the organisation is:

- familiar with relevant national and local legislation (...)

ISCC-EU (✓)

(Principle 5: Biomass production shall take place in compliance with all applicable regional and national laws and shall follow relevant international treaties)

5.1 The producer can prove that the land is used legitimately and that traditional land rights have been secured

Documents show legal ownership or lease, history of land tenure and the actual legal use of the land. The producer must identify and respect existing land rights (see Principle 1). The rights of indigenous people are respected.

5.2 There is awareness of, and compliance with, all applicable regional and national laws and ratified international treaties

The producer can demonstrate awareness of his responsibilities according to the applicable laws. Applicable laws are being complied with. They apply to:

1. National and international protected areas as referred to in Principle 1
2. Environmental impact assessment
3. Soil conservation and management, soil fertility (relating to e.g. application of fertilisers, manure and plant protection products, contamination and accumulation of hazardous substances in soils)
4. Handling of fertilisers and plant protection products

5. Water conservation and management (relating to e.g. abstraction, use and discharge of irrigation water, protection of water bodies)
6. Energy use and related emissions
7. Reuse, recycling and disposal of hazardous and non-hazardous wastes
8. Health, safety and rights of workers
9. Rights of local communities and indigenous groups.

The company should be familiar with the relevant legislation and should remain informed on changes in legislation.

FW 2. Avoidance of illegal activities

SBP (✓)

2.4.3. The BP has control systems and procedures for verifying that there is adequate protection of the forest from unauthorised activities, such as illegal logging, mining and encroachment (CPETS7c).

RSPO RED (✓)

5.2.2 (M) Where rare, threatened or endangered (RTE) species, or HCVs, are present or are affected by plantation or mill operations, appropriate measures that are expected to maintain and/or enhance them shall be implemented through a management plan. Specific guidance: (...) Controlling any illegal or inappropriate hunting, fishing or collecting activities, and developing responsible measures to resolve human-wildlife conflicts (e.g. incursions by elephants).

ISCC (✓)

2.1.2 Where production of raw material does not interfere with protection purposes (set in Principle 1), appropriate management measures shall be implemented to avoid damage or deterioration of habitats.

(...) Illegal or inappropriate hunting, fishing, trapping or collecting activities in these areas are controlled as far as possible and, if necessary, prohibited. (...).

FW 3. Continual improvement

RSB (GLOBAL) (~)

(Principle 2: Planning, Monitoring and Continuous Improvement)

RSPO RED (✓)

8.1.1 (M) The action plan for continual improvement shall be implemented, based on a consideration of the main social and environmental impacts and opportunities of the grower/mill, and shall include a range of Indicators covered by these Principles and Criteria

(Criterion 5.1. Aspects of plantation and mill management, including replanting, that have environmental impacts are identified, and plans to mitigate the negative impacts and promote the positive ones are made, implemented and monitored, to demonstrate continual improvement)

RTRS EU RED (✓)

1.3.1 A review process is carried out which identifies those social, environmental and agricultural aspects of the operation (on and off farm) where improvement is desirable.

1.3.2 A number of indicators are selected and a baseline is established to be able to monitor continual improvement on those aspects where desired improvements have been identified.

1.3.3 The results of monitoring are reviewed and appropriate action is planned and taken when necessary to ensure continual improvement.

Bonsucro EU (✓)

(Criterion 3.1 To monitor production and process efficiency; to measure the impacts of production and processing so that improvements are made over time)

Principle 5. Continuously improve key areas of the business

(Criterion 5.2 To continuously improve the status of soil and water resources)

(Criterion 5.3 To continuously improve the quality of sugarcane and products from the sugar mill)

GGL-Agri (✓)

1.4 The management plan is dealing with the policy on improvement of production, harvesting, storage, processing, distribution and marketing of products on local, national and regional level.

FW 4. Product or Benefits Diversification

GBEP (✓)

12. Jobs in the bioenergy sector.

(...)

Change in number, quality and type of job due to bioenergy production and use is fundamental to understand the social and economic sustainability of bioenergy development. The creation of different types and forms of employment is particularly linked to rural and social development by increasing and diversifying the sources of income for the local population.

FW 6. Risk assessment/management

GBEP (~)

2 Soil quality. (...) Anticipated limitations: Capacity and resources for conducting risk assessments and subsequent measurements may not be always available.(...)

7 Biological diversity in the landscape Description:

(7.2) Area and percentage of the land used for bioenergy production where nationally recognized invasive species, by risk category, are cultivated; (...) 3. If no information exists on the potential risk of invasiveness, assess according to the Weed Risk Assessment (WRA, see 'data sources'), by using the WRA question sheet and the WRA scoring sheet (substituting "low risk", "medium risk" and "high risk" for "accept", "evaluate" and "reject").(...)

RSB (GLOBAL) (✓)

2.a.i.3. The participating operator provides objective evidence demonstrating that an Environmental and Social Management Plan (ESMP) that integrates all requirements of the RSB standard and that demonstrates how biomass/biofuels operation(s) will mitigate all risks identified through the ESIA/RESA has been compiled and is being implemented.

SBP (✓)

(Criterion 1.1. The scope of the Supply Base Evaluation is described, and the forest holdings within the scope of the SBE are qualified and quantified) (...) The Supply Base Evaluation comprises both a Risk Assessment (RA) and a Supplier

Validation Programme (SVP). This Standard, together with Standard # 2, specifies the requirements for the evaluation.

RSPO RED (✓)

4.7.2.(M) All operations where health and safety is an issue shall be risk assessed, and procedures and actions shall be documented and implemented to address the identified issues. All precautions attached to products shall be properly observed and applied to the workers.

RTRS EU RED (✓)

2.3.2 Relevant health and safety risks are identified, procedures are developed to address these risks by employers, and these are monitored.

4.1.1. A social and environmental assessment is carried out prior to the establishment of large or high risk new infrastructure

Bonsucro EU (✓)

2.2.2. Main health and safety risks are assessed and measures for mitigation of risk are implemented

Greenergy (✓)

14.2.1 Documentation of water management plan aimed at sustainable water use and prevention of water pollution. Means of verification (...) Existence of a documented plan or actions for agrochemical management (including risk analysis and contamination plans).(...)

16.7.3 Hazards are identified and workers informed and adopt preventive measures to minimise risks. Records of accidents are maintained. Means of verification: Procedures are in place to prevent and minimise risks.

ISCC-EU (✓)

2.6.5 Inorganic fertilisers are stored in a covered, clean and dry area. (...)Based on risk assessment (fertiliser type, weather conditions, temporary storage), plastic coverage could be acceptable.(...)

2.10.5 There is a farm waste management plan. Waste reduction, reuse and recycling avoids or reduces wastage and avoids the use of landfill or burning

Best practices must be addressed in the waste management plan. They refer to:

- Prevention of wastes;

- Prevention of on-farm burning of certain waste materials;
- Prevention of contamination of on-site landfill disposal;
- Prevention of contamination with respect to disposal of ash;

The waste management plan should include the phases (1) risk assessment, (2) target setting, (3) risk management and (4) monitoring.(...)

3.1.1 The farm has a written health, safety and hygiene policy and procedures including issues of risk assessment

The risk assessment should include important health and safety risks, such as the use of agrochemicals, liquid fuels, lubricants, machines, generators, boilers, pumps, power tools, electrical installations and power lines. Within the risk assessment, risks connected with transporting, storage, handling, spillage and disposal shall be considered.

The health, safety and hygiene policy must at least include the points identified in the risk assessment. Policy measures could include inter alia accident and emergency procedures, hygiene procedures, dealing with any identified risks in the working situation. The policy must be made clearly understandable for all workers, reviewed and updated when the risk assessment changes.

Regarding all implemented health and safety requirements, a warning system including legally permitted sanctions exists for workers who do not apply the health- and safety requirements.

3.1.6 All workers handling and/or administering chemicals, disinfectants, plant protection products, biocides or other hazardous substances and all workers operating dangerous or complex equipment as defined in the risk assessment have certificates of competence, and/or details of other such qualifications

3.1.7 All workers received adequate health and safety training and have been instructed according to the risk assessment

FW 7. Social and Environment Impact assessment

GBEP (✓)

The following is a non-comprehensive list of such relevant issues, which mainly relate to institutional and policy aspects and others that are broader than and outside the scope of the agreed GBEP indicators: (...) Environmental, social, and

economic impact assessments of bioenergy projects and national bioenergy programmes;

RSB (GLOBAL) (✓)

2.a.i.1. The participating operator provides objective evidence determining the extent of the environmental and social impact assessment required for her/his/its operation(s) (i.e. whether the outcomes need to be equivalent with an Environmental and Social Impact Assessment (ESIA), a Rapid Environmental and Social Assessment (RESA) or whether neither of these studies or associated specialist studies are required. The determination conducted by the biomass/biofuels operation(s) of the participating operator followed the Screening Guidelines (RSB-GUI-01-002-02).

2.a.i.5. The participating operator provides objective evidence demonstrating that ongoing monitoring of effectiveness of the execution of the ESMP, and that the results of this ongoing monitoring are used to improve the ESMP and the overall performance of the biomass/biofuels operation(s).

8.a.i.6. The participating operator provides objective evidence demonstrating that a comprehensive Soil Management Plan is in place and implemented as part of the ESMP

RSPO RED (✓)

5.1.1 (M) An environmental impact assessment (EIA) shall be documented.

(Criterion 7.1. A comprehensive and participatory independent social and environmental impact assessment is undertaken prior to establishing new plantings or operations, or expanding existing ones, and the results incorporated into planning, management and operations)

7.1.1 (M) An independent social and environmental impact assessment (SEIA), undertaken through a participatory methodology including the relevant affected stakeholders, shall be documented.

RTRS EU RED (✓)

(Criterion 4.1. On and off site social and environmental impacts of large or high risk new infrastructure have been assessed and appropriate measures taken to minimize and mitigate any negative impacts)

4.1.1. A social and environmental assessment is carried out prior to the establishment of large or high risk new infrastructure

Bonsucro EU (✓)

4.1.3. The key environmental issues are covered by an appropriate and implemented environmental impact and management plan (EIMP)

(Criterion 5.7. For greenfield expansion or new sugarcane projects, to ensure transparent, consultative and participatory processes that address cumulative and induced effects via an environmental and social impact assessment (ESIA))

5.7.1. Percentage of greenfield expansion or new sugarcane project covered by ESIA

Greenergy (✓)

14.1.1 No evidence of noncompliance with relevant national and local laws and regulations including:

- Environmental Impact Assessment

(...)

13.2.1 Documentation of soil management plan aimed at sustainable soil management, erosion prevention and erosion control.

ISCC-EU (~)

2.1.1 Environmental aspects are considered if planning buildings, drainage etc.

Environmental impact of new buildings, drainage systems and other constructions or systems are assessed and kept as little as possible. If any of these activities are done, a report must be available to show that environmental aspects have been considered and negative impacts have been kept as little as possible.

2.3.1 Conservation of soils.

(...) A soil management plan aimed at sustainable soil management, erosion prevention and erosion control must be documented (...).

GGL-Forest (✓)

Principle 3 Environmental impact

FW 8. Avoid and mitigate negative impacts and promote positive ones

RSB (GLOBAL) (~)

5.a.i.4. The measures agreed as per indicator 5.a.i.2. include measures to mitigate negative socio- economic impacts resulting directly or indirectly from the biomass/biofuels operation(s) on the directly affected stakeholders.

11.b.i.2. The identified measures (11.b.i.1.) to avoid and/or mitigate negative impacts of the technologies use in biomass/biofuel operation(s) on stakeholders, communities, industries, society at large and the environment are implemented.

SBP (~)

2.1.2 The BP has control systems and procedures to identify and address potential threats to forests and other areas with high conservation values from forest management activities. (...) The potential impacts of management activities on forests and other areas with high conservation values and biodiversity should be evaluated, and BPs should have systems in place to verify that mitigation measures are implemented in the field.

2.2.1. The BP has control systems and procedures to verify that feedstock is sourced from forests where there is appropriate assessment of impacts, and planning, implementation and monitoring to minimise them. (...) Potential impacts of feedstock harvesting on ecosystems and biodiversity should be identified, with mitigation measures implemented in the field as necessary (...)

2.2.2. The BP has control systems and procedures for verifying that feedstock is sourced from forests where management maintains or improves soil quality.(...) Potential impacts of feedstock harvesting on soil should be identified, with mitigation measures implemented in the field as necessary.(...)

2.2.4. The BP has control systems and procedures to ensure that biodiversity is protected. (...)Evaluation of the likely impacts of management practice and feedstock harvesting on ecosystems and biodiversity should be identified, and appropriate mitigation measures implemented.(...)

2.2.5. The BP has control systems and procedures for verifying that the process of residue removal minimises harm to ecosystems.(...)Likely impacts of residue removal should be identified, and appropriate mitigation measures implemented.(...)

RSPO RED (✓)

(Criterion 5.1. Aspects of plantation and mill management, including replanting, that have environmental impacts are identified, and plans to mitigate the negative impacts and promote the positive ones are made, implemented and monitored, to demonstrate continual improvement)

(Criterion 6.1. Aspects of plantation and mill management that have social impacts, including replanting, are identified in a participatory way, and plans to mitigate the negative impacts and promote the positive ones are made, implemented and monitored, to demonstrate continual improvement)

RTRS EU RED (✓)

(Criterion 4.1 On and off site social and environmental impacts of large or high risk new infrastructure have been assessed and appropriate measures taken to minimize and mitigate any negative impacts)

4.1.4 Measures to minimize or mitigate the impacts identified by the assessment are documented and are being implemented

4.3.3 Soil organic matter is monitored to quantify change in soil carbon and steps are taken to mitigate negative trends.

(Criterion 5.4 Negative environmental and health impacts of phytosanitary products are reduced by implementation of systematic, recognized Integrated Crop Management (ICM) techniques)

Bonsucro EU (~)

4.1.4 Measures to minimize or mitigate the impacts identified by the assessment are documented and are being implemented

Greenergy (~)

I 7.2.3 Potential impacts on legal or customary rights, property, resources, or livelihoods of local peoples are identified.

ISCC-EU (✓)

2.1.1 Environmental aspects are considered if planning buildings, drainage etc.

Environmental impact of new buildings, drainage systems and other constructions or systems are assessed and kept as little as possible. If any of these activities are done, a report must be available to show that environmental aspects have been considered and negative impacts have been kept as little as possible.

4.9 All impacts for surrounding areas, communities, users and land owners taken into account and sufficiently compensated for

A participatory social impact assessment has been conducted, where all relevant stakeholders including local communities and indigenous people have been engaged. The report is publicly available in appropriate language to surrounding

communities. On the basis of that report an action plan to address identified social impacts and a continued dialogue with surrounding communities is in place. Documents of regular meetings with communities (with two-way communication) and local government with listed risks and/or impacts and evidence of minuted negotiations or resolution processes are compiled.

FW 9. Management plan

RSB (GLOBAL) (✓)

2c.i.1. The participating operator provides objective evidence demonstrating that (a) business plan(s) for her/his/its biomass/biofuels operation(s) has/have been compiled and (b) that this/these business plan(s) show(s) the commitment of the management of the biomass/biofuels operation(s) to long term economic viability of the biomass/biofuels operation(s).

SBP (~)

3.1.1. The BP implements a management and monitoring system to maintain compliance with the requirements of this Standard, together with a process of review and feedback into planning (CPET S6b).

3.2.1 The BP implements a management review system, which should have the authority to make appropriate improvements to the management system.

RSPO RED (✓)

3.1.1 (M) A business or management plan (minimum three years) shall be documented that includes, where appropriate, a business case for scheme smallholders.

3.1.2 An annual replanting programme projected for a minimum of five years (but longer where necessary to reflect the management of fragile soils, see Criterion 4.3), with yearly review, shall be available.

5.1.3 This plan shall incorporate a monitoring protocol, adaptive to operational changes, which shall be implemented to monitor the effectiveness of the mitigation measures. The plan shall be reviewed as a minimum every two years to reflect the results of monitoring and where there are operational changes that may have positive and negative environmental impacts.

RTRS EU RED (~)

4.2.5 There is a residue management plan including all areas of the property.

Greenergy (✓)

I2.3.2 Documented and implemented management plan including measures to avoid damage to or disturbance of the above mentioned species and habitats.

I4.2.1 Documentation of water management plan aimed at sustainable water use and prevention of water pollution.

ISCC (~)

2.3.1 Conservation of soils.

(...) A soil management plan aimed at sustainable soil management, erosion prevention and erosion control must be documented (...).

2.5.3 Application of good agricultural practices to reduce water usage and to maintain and improve water quality.

(...) Documentation of water management plan aimed at sustainable water use and prevention of water pollution shall exist (...).

2.10.5 There is a farm waste management plan. Waste reduction, reuse and recycling avoids or reduces wastage and avoids the use of landfill or burning

(...)

GGL-Agri (✓)

1.1 A long term commitment to adhere to the principles and criteria for sustainable agriculture, expressed in a written and up to date agriculture management plan or other management documents.

GGL-Forest (✓)

Principle 2 Management plan

FW 10. Apply precautionary approach**RSB (GLOBAL) (✓)**

7.a.i.2. The objective evidence provided by the participating operator on the identification of conservation values as per the screening exercise (RSB-GUI-01-002-02) includes: (...)

- Comprehensive description of the precautionary measures and practices identified and implemented to ensure that the conservation values of global,

regional or local importance relating to and/or affected by the potential or existing biomass/biofuels operation(s) of the participating operator (i.e. including consideration of the wider landscape context) are maintained or enhanced.

7.a.i.6. The participating operator provides objective evidence demonstrating that precautionary measures and implemented practices have been effective in maintaining or enhancing conservation values of global, regional or local importance.

7.a.i.7. The participating operator provides objective evidence demonstrating that the results of the RSB Screening Exercise (RSBGUI- 01-002-02) and related precautionary measures have been effective in giving preference to operating in areas which pose the lowest risk to conservation values of global, regional or local importance.

ISCC (~)

2.3.1 Conservation of soils

(...) Applying precautionary measures prevents soil degradation. Appropriate management measures include inter alia crop rotations and intercropping, landscaping elements or an appropriate type and use of machinery (...)

FW 11. Identify and analyse potential emergencies

GBEP (~)

16. Incidences of occupational injury, illness and fatalities

RSB (GLOBAL) (✓)

4.f.i.5. The participating operator provides objective evidence demonstrating that procedures and measures addressing emergencies and accidents are in place, fully implemented, continuously monitored and improved, and apply to all workers engaged in the operations of the participating operator.

4.f.i.6. The participating operator provides objective evidence demonstrating that all workers understand the participating operators' accident and emergency procedures and measures.

4.f.i.7. The participating operator maintains, and reviews periodically records of all work-related accidents, and adjusts its accident and emergency procedures to minimize the risk of work-related accidents.

4.f.i.8. The participating operator provides objective evidence demonstrating that first aid kits, fire extinguishers, and spill response material are available in sufficient quantity (i.e. readily available and accessible to workers) and quality (i.e. current and periodically serviced and appropriate to address the associated hazards and risks) at all sites including mobile facilities and in the vicinity of agricultural sites, and that workers are knowledgeable of such equipments and its use.

SBP (~)

2.8.1 The BP has control systems and procedures for verifying that appropriate safeguards are put in place to protect the health and safety of forest workers (CPET S12)

RSPO RED (✓)

4.7.5. Accident and emergency procedures shall exist and instructions shall be clearly understood by all workers. Accident procedures shall be available in the appropriate language of the workforce. Assigned operatives trained in First Aid should be present in both field and other operations, and first aid equipment shall be available at worksites. Records of all accidents shall be kept and periodically reviewed.

RTRS EU RED (✓)

2.3 6 Accident and emergency procedures exist and instructions are clearly understood by all workers.

2.3.7 In case of accidents or illness, access to first aid and medical assistance is provided without delay.

Bonsucro EU (✓)

2.2.1. Lost time accident frequency

2.2.6. All workers present on the field and/or mill have access to first aid and provision for emergency response

Greenergy (~)

16.7.3 Hazards are identified and workers informed and adopt preventive measures to minimise risks. Records of accidents are maintained.

ISCC-EU (✓)

3.1.1 The farm has a written health, safety and hygiene policy and procedures including issues of risk assessment

(...)

The health, safety and hygiene policy must at least include the points identified in the risk assessment. Policy measures could include inter alia accident and emergency procedures, hygiene procedures, dealing with any identified risks in the working situation. The policy must be made clearly understandable for all workers, reviewed and updated when the risk assessment changes.

(...)

FW 12. Planning and management at the landscape level

GBEP (~)

7 Biological diversity in the landscape.

RED (~)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Environment, climate change, good agricultural condition of land

RSPO (✓)

5.2.1 (M) Information shall be collated in a High Conservation Value (HCV) assessment that includes both the planted area itself and relevant wider landscape-level considerations (such as wildlife corridors).

FW 13. Connectivity, fragmentation, forest encroachment

GBEP (~)

7. Biological diversity in the landscape. (...) Because biodiversity is unequally distributed across space, impacts on biodiversity from the conversion of land depend on where conversion takes place. The conversion of areas of high biodiversity value or critical ecosystems can have significant negative impacts on species and ecosystems, including through fragmentation and landscape change. (...)

RSB (GLOBAL) (✓)

7.d.i.3. The participating operator provides objective evidence demonstrating that, where there is the risk that biomass/biofuels operation(s) could increase the fragmentation of surrounding ecosystems, the spatial layout of the

biomass/biofuels operation(s) is adjusted to not cause any additional fragmentation and to maintain connectivity of ecosystems through the creation of ecological corridors within her/his/its biomass/biofuels operation(s).

RSPO RED (✓)

5.2.2 (M) Where rare, threatened or endangered (RTE) species, or HCVs, are present or are affected by plantation or mill operations, appropriate measures that are expected to maintain and/or enhance them shall be implemented through a management plan. These measures will include: (...)

- Avoiding damage to and deterioration of HCV habitats such as by ensuring that HCV areas are connected, corridors are conserved, and buffer zones around HCV areas are created; (...)

ISCC (✓)

2.1.2 Where production of raw material does not interfere with protection purposes (set in Principle 1), appropriate management measures shall be implemented to avoid damage or deterioration of habitats.

(...)

Existing ecological corridors and important landscape elements shall be maintained or, if necessary, restored to minimize fragmentation of the protected habitats. This shall take place in accordance with the type of terrain, wildlife and agricultural practices. Around all protected areas (covered in Principle 1), set aside land or wildlife corridors, appropriate buffer zones shall be protected, restored or set up.

FW 14. To implement adaptive management

RSPO (~)

7.3.5 Areas required by affected communities to meet their basic needs, taking into account potential positive and negative changes in livelihood resulting from proposed operations, shall be identified in consultation with the communities and incorporated into HCV assessments and management plans (see Criterion 5.2). Specific guidance: The management plan will be adaptive to changes in HCV 5 and 6. Decisions will be made in consultation with the affected communities.

GGL-Agri (~)

1.1 A long term commitment to adhere to the principles and criteria for sustainable agriculture, expressed in a written and up to date agriculture management plan or other management documents.

1.2 Policy reviews are carried out periodically.

GGL-Forest (✓)

4.1 Monitoring shall be conducted to assess the condition of the forest, yields of the forest products, and management activities. The results of monitoring shall be incorporated into the implementation and revision of the management plan.

FW 15. Monitor production and process efficiency; to measure the impacts of production and processing

RSPO (✓)

5.3.3. A waste management and disposal plan to avoid or reduce pollution shall be documented and implemented.

Guidance:

The waste management and disposal plan should include measures for:

- Identifying and monitoring sources of waste and pollution.
- Improving the efficiency of resource utilisation and recycling potential wastes as nutrients or converting them into value-added products (e.g. through animal feeding programmes). (...)

Bonsucro (✓)

(Criterion 3.1 To monitor production and process efficiency; to measure the impacts of production and processing so that improvements are made over time).

FW 16. Technological inputs

RSB (GLOBAL) (~)

10.a.i.2. The participating operator provides objective evidence demonstrating that Best Available Technology (BAT) to prevent or reduce air pollution and mitigate its effects and associated risks, has been identified and implemented within three years of certification.

11.a.i.1. The participating operator provides documented evidence demonstrating that information on the use of technologies in her/his/its biomass/biofuels operation(s) is publicly available (except for information which is protected by national law or international agreements on intellectual property).

11.b.i.1. The participating operator provides objective evidence demonstrating that a risk assessment in relation to the use of technologies, including GMOs, has been conducted prior to certification, which: (...).

FW 18. Environmentally friendly technologies

RSB (GLOBAL) (✓)

11.c.i.1. The participating operator provides objective evidence demonstrating that a risk assessment in relation to the use of technologies, including GMOs, has been conducted prior to certification, which:

- identifies all technologies of her/his/its operation(s) which actually or potentially pose a social, environmental and/or economic risk to stakeholders, communities, industries, society at large and the environment;
- identifies all impacts which these identified technologies actually and potentially have on stakeholders, communities, industries, society at large and the environment;
- demonstrates the social and environmental benefits brought by these identified technologies compared to the other alternatives;
- identifies measures to avoid and/or mitigate actual and potentially negative impacts of these identified technologies of her/his/its operation(s) on stakeholders, communities, industries, society at large and the environment; and
- identifies measures to systematically monitor these identified factors and aspects of the biomass/biofuels operation(s), their actual and potential impacts, as well as the measures identified and implemented to avoid or mitigate associated risks and impacts, and the effectiveness of these measures.

ISCC (✓)

2.3 Soil conservation and avoidance of soil degradation

2.3.1 Good agricultural practices must be applied with respect to: Prevention and control of erosion, maintaining and improving soil nutrient balance, soil organic matter, soil pH, soil structure, soil biodiversity and prevention of salinization. A

soil management plan aimed at sustainable soil management, erosion prevention and erosion control must be documented. Annual documentation of applied good agricultural practices with respect to the abovementioned aspects must be in place

2.3.2 Field cultivation techniques used to reduce the possibility of soil erosion.

Annex 3. COMPLEMENTARY INDICATORS: meaningfully reflected in the analysed schemes

3.1. Forest schemes

In Table 7 the benchmark and gap analysis of the selected Forest schemes against the identified Complementary indicators is shown. This Table shows the complementary indicators that were meaningfully reflected in the analysed schemes.

Table 7 Benchmark and Gap Analysis of the selected Forest Schemes against the identified Complementary Indicators (meaningfully reflected in the analysed schemes)

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal				
Theme 1: Environment	1	Waste	1	Waste Management and Reduction, recycle and re-use of waste	✓	✓													~			
			2	Waste generation per ton of product																		
	2	Best environmental practices	3	“Responsible” management of wastewater																		
			4	No use of burning	✓	✓							✓									
			5	Responsible management infrastructural development, transport activities and silviculture	✓	✓	✓			~			✓									
	3	Land Use and Land Use Change	6	Assure the permanence of vegetation (regenerate vegetation cover)	✓	✓	✓		✓		✓	~				✓		✓				
			7	Rehabilitate degraded ecosystems	✓	✓							~									
			8	Land Use Change	✓	✓	~	✓	✓	✓	~					✓	✓	✓				

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	ICFPE	Montreal
	4	Sustainable harvesting of forest products and non-wood forest products	9	Harvest products and services from the Management Unit at or below a level which can be permanently sustained	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
C1: Resource efficiency	5	Resource use	10	Efficiency of systems of production and transformation			✓	✓	✓	✓								
			11	Intensity of fossil fuel use														
C1: Resource efficiency	6	Best Practices for Resource Efficiency	12	Energy saving practices														
C2: Climate change	7	Best Environmental Practices for Climate Change reduction	13	Practices to diminish GHG emissions														

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCPE	Montreal		
			14	Practices to increase carbon dioxide sequestration																
	8	Climate change	15	Maintenance of forest contribution to global carbon cycles	✓	✓		✓		✓			✓	✓	✓	✓	✓	✓		
C3: Biodiversity	9	Best Environmental Practices for Biodiversity conservation	16	Practices to diminish spread of invasive introduced species and new pests or diseases	✓	✓												~		
			17	"Responsible" application of agrochemicals (in the case of forestry minimize or eliminate) and biological control agents	✓	✓														
			18	Avoid harvesting of threatened or endangered plant species	~	✓	✓	✓	~	~	~	~	~	~	~	~	~	~	✓	~
	10	Other indicators for biodiversity conservation	19	Maintain or restore of areas of water influence	✓	✓		✓				✓	✓	✓		✓		✓		
			20	Monitor periodically key biotic and abiotic factors that might affect health and vitality of ecosystems	~	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
C4:Soils	11	Best Environmental Practices	21	Avoid planting in certain areas to protect soils																
	12	Other considerations	22	Soil surface mechanically tilled per year (% of cultivated area)																

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal		
		for soil conservation	23	Measures for soil conservation	✓	✓	✓	✓	✓	✓		✓				✓	~	✓		
			24	pH (Percentage fields with samples showing analyses within acceptable limits for pH)																
C5: Water	13	Best environmental practices	25	Avoid natural water contamination																
Theme 2: Social	14	Social wellbeing	26	Promote gender equality	✓						✓			~	~					
Theme2: Social	15	Social wellbeing	27	Availability of a mutually agreed and documented system for dealing with complaints and grievances, which is implemented and accepted by affected parties	✓	✓		✓		✓										
			28	Use local processing, local services, and local value adding.	✓	✓											✓			
			29	Benefit sharing mechanism			~	✓	✓	✓	✓	✓	✓	✓	~	✓	✓			✓
			30	Support to vulnerable pPeople																

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	ICFPE	Montreal
Theme 2: Social	16	Rights of indigenous peoples & local communities	31	Rights of indigenous peoples & local communities -defined in the United Nations Declaration on the Rights of Indigenous Peoples (2007) and ILO Convention 169 (1989).	✓	✓		✓		✓					✓			
			32	Existence of conflict management mechanisms	✓	✓		✓		✓	✓		✓	✓				
T2: Social	17	Traditional knowledge	33	Traditional knowledge	✓	✓		✓	✓	✓	✓		✓	✓				
C7: Participation and transparency	18	Documented system for participatory processes	34	Negotiations concerning compensation for loss of legal, customary or user rights are dealt with through a documented system that enables indigenous peoples, local communities and other stakeholders to express their views through their own representative institutions as free, prior and informed consent and negotiated agreements	✓	✓												
9. Employment and labour conditions	19	Employment and labour conditions	35	Fair pricing and transparent contracts								~						
			36	Training and requalification of the workforce	✓	✓		✓		✓		✓			✓			

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCPE	Montreal		
Theme 3: Economic	20	Economic	37	Value of products (includes value and volume of production and/or value added per ton)				✓		✓			✓	✓	✓		✓	✓		
			38	Means for research		✓			✓			✓	✓	✓		✓	✓		✓	✓
			39	Incentives for investments				✓		✓		✓		✓	✓					

CI 1. Waste Management and reduction, recycle and re-use of waste

FSC (✓)

10.12 The Organization shall dispose of waste materials in an environmentally appropriate manner.

PEFC (✓)

5.2.7 Appropriate forest management practices such as reforestation and afforestation with tree species and provenances that are suited to the site conditions or the use of tending, harvesting and transport techniques that minimise tree and/or soil damages shall be applied. The spillage of oil during forest management operations or the indiscriminate disposal of waste on forest land shall be strictly avoided. Non-organic waste and litter shall be avoided, collected, stored in designated areas and removed in an environmentally-responsible manner.

Montreal Process (~)

6.1.i Recovery or recycling of forest products as a percent of total forest products consumption

CI 4. No use of burning

FSC (✓)

10.5 The Organization* shall use silvicultural* practices that are ecologically appropriate for the vegetation, species, sites and management objectives*.

PEFC (✓)

5.2.6 Lighting of fires shall be avoided and is only permitted if it is necessary for the achievement of the management goals of the forest management unit.

CI 5. Responsible management infrastructural development, transport activities and silviculture

FSC (✓)

10.5 The Organization shall use silvicultural practices that are ecologically appropriate for the vegetation, species, sites and management objectives.

10.10 The Organization shall manage infrastructural development, transport activities and silviculture so that water resources and soils are protected, and disturbance of and damage to rare and threatened species, habitats, ecosystems and landscape values are prevented, mitigated and/or repaired.

PEFC (✓)

5.1.9 Forest management practices shall safeguard the quantity and quality of the forest resources in the medium and long term by balancing harvesting and growth rates, and by preferring techniques that minimise direct or indirect damage to forest, soil or water resources.

5.1.10 Appropriate silvicultural measures shall be taken to maintain or reach a level of the growing stock that is economically, ecologically and socially desirable.

5.2.7 Appropriate forest management practices such as reforestation and afforestation with tree species and provenances that are suited to the site conditions or the use of tending, harvesting and transport techniques that minimise tree and/or soil damages shall be applied. The spillage of oil during forest management operations or the indiscriminate disposal of waste on forest land shall be strictly avoided. Non-organic waste and litter shall be avoided, collected, stored in designated areas and removed in an environmentally-responsible manner.

5.3.8 Adequate infrastructure such as roads, skid tracks or bridges shall be planned, established and maintained to ensure efficient delivery of goods and services while minimising negative impacts on the environment

5.4.11 Infrastructure shall be planned and constructed in a way that minimises damage to ecosystems, especially to rare, sensitive or representative ecosystems and genetic reserves, and that takes threatened or other key species – in particular their migration patterns – into consideration.

5.5.5 Construction of roads, bridges and other infrastructure shall be carried out in a manner that minimises bare soil exposure, avoids the introduction of soil into watercourses and preserves the natural level and function of water courses and river beds. Proper road drainage facilities shall be installed and maintained.

Tarapoto FMU (✓)

10.6 Measures for protection of water courses from forest activities.

Tarapoto CL (~)

4.8 Impact of activities in other sectors on the conservation of forest ecosystems (mining, ranching, energy, infrastructure, etc.).

ATO (✓)

II.A.4.1. The planning and establishment of infrastructure (primary and secondary roads, timber yards, skidding tracks) takes into consideration the topography of the forest area and the needs of exploitation.

II.A.4.2. Sizes of infrastructure (primary and secondary roads, timber yards, skidding tracks) are reduced to the barest minimum possible.

II.A.4.3. Minimum infrastructure required for logging is made permanent.

II.A.4.4. Measures are taken to ensure that infrastructure established for logging and forest management in general, do not disturb the flow of water in the network of river streams, etc.

CI 6. Assure the permanence of vegetation (regenerate vegetation cover)**FSC (✓)**

10.1 After harvest or in accordance with the management plan, The Organization shall, by natural or artificial regeneration methods, regenerate vegetation cover in a timely fashion to pre-harvesting or more natural conditions.

PEFC (✓)

5.4.4 Forest management shall ensure successful regeneration through natural regeneration or, where not appropriate, planting that is adequate to ensure the quantity and quality of the forest resources

Tarapoto FMU (✓)

10.4 Rates of regeneration and forest ecosystem structure.

Tarapoto CL (✓)

4.5 Rate of natural regeneration, species composition and survival.

ASI (✓)

2.1 Extent of natural regeneration

ATO (~)

II.A.3.1. Reforestation is implemented with chosen species in conformity with the specifications of the management plan.

Lepaterique CL (✓)

3.1. Regeneration and changes in the composition and structure of forest ecosystems.

MCFPE (✓)

4.2 Regeneration Area of regeneration within even-aged stands and uneven-aged stands, classified by regeneration type.

CI 7. Rehabilitate degraded ecosystems**FSC (✓)**

6.3 The Organization shall identify and implement effective actions to prevent negative impacts of management activities on the environmental values, and to mitigate and repair those that occur, proportionate to the scale, intensity and risk of these impacts

PEFC (✓)

5.2.1 Forest management planning shall aim to maintain and increase the health and vitality of forest ecosystems and to rehabilitate degraded forest ecosystems, whenever this is possible by silvicultural means

ATO (~)

II.A.3.1. Reforestation is implemented with chosen species in conformity with the specifications of the management plan.

CI 8. Land Use Change**FSC (✓)**

6.9 The Organization* shall not convert natural forest* to plantations*, nor natural forests or plantations on sites directly converted from natural forest to non-forest land use, except when the conversion:

- a) affects a very limited portion of the area of the Management Unit*, and
- b) will produce clear, substantial, additional, secure long-term conservation benefits in the Management Unit, and

c) does not damage or threaten High Conservation Values*, nor any sites or resources necessary to maintain or enhance those High Conservation Values.

PEFC (✓)

5.1.11 Conversion of forests to other types of land use, including conversion of primary forests to forest plantations, shall not occur unless in justified circumstances where the conversion:

a) is in compliance with national and regional policy and legislation relevant for land use and forest management and is a result of national or regional land-use planning governed by a governmental or other official authority including consultation with materially and directly interested persons and organisations; and

b) entails a small proportion of forest type; and

c) does not have negative impacts on threatened (including vulnerable, rare or endangered) forest ecosystems, culturally and socially significant areas, important habitats of threatened species or other protected areas; and

d) makes a contribution to long-term conservation, economic, and social benefits.

Tarapoto FMU (~)

10.4 Rates of regeneration and forest ecosystem structure.

ITTO FMU (✓)

2.5. Changes in forested area

Tarapoto CL (✓)

4.6 Rate of conversion of forest cover to other uses.

ITTO CL (✓)

2.5. Changes in forested area

ASI (~)

2.1 Extent of natural regeneration

Lepaterique CL (✓)

3.1. Regeneration and changes in the composition and structure of forest ecosystems.

Near East Process (✓)

1.1 Area and percentage of forests and “other wooded lands” (including plantations, agroforestry, shelterbelts) with their change over time (deforestation, reforestation and conversion).

MCFPE (✓)

4.2 Regeneration Area of regeneration within even-aged stands and uneven-aged stands, classified by regeneration type.

CI 9. Harvest products and services from the Management Unit at or below a level which can be permanently sustained**FSC (✓)**

5.2 The Organization shall normally harvest products and services from the Management Unit at or below a level which can be permanently sustained.

PEFC (✓)

5.1.5 Management plans or their equivalents shall include at least a description of the current condition of the forest management unit, long-term objectives; and the average annual allowable cut, including its justification and, where relevant, the annually allowable exploitation of non-timber forest products.

5.3.6 Harvesting levels of both wood and non-wood forest products shall not exceed a rate that can be sustained in the long term, and optimum use shall be made of the harvested forest products, with due regard to nutrient off-take

Tarapoto FMU (✓)

9.1 Annual extraction of timber and non-timber forest products compatible with the sustainability capacity of the resource base.

ITTO FMU (✓)

4.2. Actual and sustainable harvest of wood and non-wood forest product

Tarapoto CL (✓)

1.1 Indicators of Income, Production and Consumption

- Economic profitability of management and sustainable use of the forests.
- Sustainable production, consumption and extraction of forest products.

- Values of forest products from sustainable sources and from unsustainable sources as percentages of Gross National Product.
- Employment and direct and indirect income from sustainable activities in the forest sector and generation of forest-based employment in relation to total national employment.
- Average per capita income in different forest sector activities.
- Efficiency and competitiveness of forest product production and processing systems
- Impact of the economic use of forests on the availability of forest resources of importance to local populations.
- Relationship between direct and indirect uses of the forests.

ITTO CL (✓)

4.2. Actual and sustainable harvest of wood and non-wood forest products

ASI (✓)

3.4. Degree of non-destructive harvest

5.3. Difference between annual allowable and actual cuts

ATO (✓)

II.A.1.3. IIA.1.3. In the area of harvesting, the standards are explicit on:

- minimum number of large trees to be retained as seed producers (mother trees) per ha and species
- maximum number of trees to be harvested per ha;
- harvesting techniques for large trees to be removed should be such as to avoid too large gaps.
- the minimum exploitable diameter for each species.

II.A.2.3. Calculations of allowable cut and rotation period are clearly detailed in the management plan and are consistent with silvicultural standards, increment data, prior inventory and harvestable areas, and are established at levels considered compatible with sustainable production of the forest.

CILSS (✓)

4.3 Annual balance between growth and removal of wood products (and its change over time)

SADC (✓)

4.3 Periodical balance between growth and removal of wood products

Lepaterique CL (✓)

6.3. Annual harvest of wood and non-wood forest products in relation to levels of sustainability.

Near East Process (✓)

4.2 Annual balance between wood increment and wood harvesting and trends

Montreal Process (✓)

2.d Annual harvest of wood products by volume and as a percentage of net growth or sustained yield.

CI 10. Efficiency of systems of production and transformation**Tarapoto FMU (✓)**

11.3 Efficiency of systems of production and transformation of forest products.

ITTO FMU (✓)

7.3. Forest products' industry structure and efficiency

Tarapoto CL (✓)

1.1 Indicators of Income, Production and Consumption (...)

- Efficiency and competitiveness of forest product production and processing systems
Impact of the economic use of forests on the availability of forest resources of importance to local populations.

ITTO CL (✓)

7.3. Forest products' industry structure and efficiency.

CI 15. Maintenance of forest contribution to global carbon cycles

FSC (✓)

6.3 The Organization shall identify and implement effective actions to prevent negative impacts of management activities on the environmental values, and to mitigate and repair those that occur, proportionate to the scale, intensity and risk of these impacts.

PEFC (✓)

5.1.5 Management plans or their equivalents shall include at least a description of the current condition of the forest management unit, long-term objectives; and the average annual allowable cut, including its justification and, where relevant, the annually allowable exploitation of non-timber forest products.

5.1.9 Forest management practices shall safeguard the quantity and quality of the forest resources in the medium and long term by balancing harvesting and growth rates, and by preferring techniques that minimise direct or indirect damage to forest, soil or water resources

ITTO FMU (✓)

4.4 Total amount of carbon stored in forest stands

ITTO CL (✓)

4.4 Total amount of carbon stored in forest stands

CILSS (✓)

1.2 Biomass (and its changes over time)

1.3 Available carbon stock

SADC (✓)

1.2 Biomass

Lepaterique CL (✓)

4.6. Estimates of biomass estimate forest ecosystems as a function of carbon sequestration and carbon sinks.

Near East Process (✓)

1.2 Biomass/Standing volume, Growing stock, Carbon stock

MCFPE (✓)

1.4 Carbon stock Carbon stock of woody biomass and of soils on forest and other wooded land

Montreal Process (✓)

5.a Total forest ecosystem carbon pools and fluxes

5.b Total forest product carbon pools and fluxes

5.c Avoided fossil fuel carbon emissions by using forest biomass for energy.

CI 16. Practices to diminish spread of invasive introduced species and new pests or diseases.**FSC (✓)**

10.3 The Organization shall only use alien species when knowledge and/or experience have shown that any invasive impacts can be controlled and effective mitigation measures are in place.

PEFC (✓)

5.4.5 For reforestation and afforestation, origins of native species and local provenances that are well-adapted to site conditions shall be preferred, where appropriate. Only those introduced species, provenances or varieties shall be used whose impacts on the ecosystem and on the genetic integrity of native species and local provenances have been evaluated, and if negative impacts can be avoided or minimised. Note: CBD (Convention on Biological Diversity) Guiding Principles for the Prevention, Introduction, and Mitigation of Impacts of Alien Species that Threaten Ecosystems, Habitats or Species are recognised as guidance for avoidance of invasive species.

Montreal (~)

3.a Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive alien species) beyond reference conditions.

CI 17. "Responsible" application of agrochemicals (in the case of forestry minimize or eliminate) and biological control agents**FSC (✓)**

10.6 The Organization* shall minimize or avoid the use of fertilisers. When fertilisers are used, The Organization shall demonstrate that the use is equally or more ecologically and economically beneficial than the use of silvicultural systems that do not require fertilisers, and prevent, mitigate, and/ or repair damage to environmental values*, including soils.

10.7 The Organization shall use integrated pest management and silviculture systems which avoid, or aim at eliminating, the use of chemical pesticides. The Organization shall not use any chemical pesticides prohibited by FSC policy. When pesticides are used, The Organization shall prevent, mitigate, and / or repair damage to environmental values and human health.

10.8 The Organization shall minimize, monitor and strictly control the use of biological control agents in accordance with internationally accepted scientific protocols. When biological control agents are used, The Organization shall prevent, mitigate, and/or repair damage to environmental values.

PEFC (✓)

5.2.8 The use of pesticides shall be minimised and appropriate silvicultural alternatives and other biological measures preferred.

5.2.9 The WHO Type 1A and 1B pesticides and other highly toxic pesticides shall be prohibited, except where no other viable alternative is available. Note: Any exception to the usage of WHO Type 1A and 1B pesticides shall be defined by a specific forest management standard.

5.2.10 Pesticides, such as chlorinated hydrocarbons whose derivatives remain biologically active and accumulate in the food chain beyond their intended use, and any pesticides banned by international agreement, shall be prohibited. Note: “pesticides banned by international agreements” are defined in the Stockholm Convention on Persistent Organic Pollutants 2001, as amended.

5.2.11 The use of pesticides shall follow the instructions given by the pesticide producer and be implemented with proper equipment and training.

5.2.12 Where fertilisers are used, they shall be applied in a controlled manner and with due consideration for the environment.

CI 18. Avoid harvesting of threatened or endangered plant species

FSC (~)

9.1 The Organization, through engagement with affected stakeholders, interested stakeholders and other means and sources, shall assess and record the

presence and status of the following High Conservation Values in the Management Unit, proportionate to the scale, intensity and risk of impacts of management activities, and likelihood of the occurrence of the High Conservation Values: HCV 1 - Species diversity. Concentrations of biological diversity including endemic species, and rare, threatened or endangered species, that are significant at global, regional or national levels.

PEFC (✓)

5.4.3 Protected and endangered plant and animal species shall not be exploited for commercial purposes. Where necessary, measures shall be taken for their protection and, where relevant, to increase their population.

Tarapoto FMU (✓)

10.2 Measures to protect, recuperate and sustainable use wild populations of species in danger of extinction.

ITTO FMU (✓)

5.3. Existence and implementation of procedures to identify and protect endangered, rare and threatened species of forest-dependent flora and fauna

Tarapoto CL (~)

(Criterion 4: Conservation of forest cover and of biological diversity)

4.1 Area, by forest type, in categories of protected areas, in relation to total forest area.

4.2 Measures for «in situ» conservation of species in danger of extinction.

ITTO CL (~)

5.3. Existence and implementation of procedures to identify and protect endangered, rare and threatened species of forest-dependent flora and fauna

ASI (~)

(Criterion 3: Maintenance and enhancement of bio-diversity)

3.2 Number of, threatened, keystone, flagship and endemic species of plants and animals

ATO (~)

III.2.7. Rare or endangered species are protected.

CILSS (~)

(Criterion 2: Conservation and enhancement of biological diversity in forest ecosystems)

2.4 Area cleared annually of forest ecosystems containing endemic species

2.6 Number of forest dependent species at risk

SADC (~)

(Criterion 2: Conservation and enhancement of biological diversity in forest ecosystems)

2.4 Area cleared annually of forest ecosystems containing endemic species

2.6 Number of forest dependent species at risk

Lepaterique (~)

2.10. Number of endemic, threatened and/or endangered species.

Near East (~)

2.6 Area and number of species at risk in forest areas

MCFPE (✓)

4.8. Threatened forest species.

Number of threatened forest species, classified according to IUCN Red List categories in relation to total number of forest species

Montreal (~)

1.2.b Number and status of native forest-associated species at risk, as determined by legislation or scientific assessment.

CI 19. Maintain or restore of areas of water influence**FSC (✓)**

6.7 The Organization shall protect or restore natural water courses, water bodies, riparian zones and their connectivity. The Organization shall avoid negative impacts on water quality and quantity and mitigate and remedy those that occur.

PEFC (✓)

5.5.4 Special care shall be given to forest management practices in forest areas with water protection functions to avoid adverse effects on the quality and quantity of water resources. Inappropriate use of chemicals or other harmful substances or inappropriate silvicultural practices influencing water quality in a harmful way shall be avoided. 5.5.5 Construction of roads, bridges and other infrastructure shall be carried out in a manner that minimises bare soil exposure, avoids the introduction of soil into watercourses and preserves the natural level and function of water courses and river beds. Proper road drainage facilities shall be installed and maintained.

ITTO FMU (✓)

6.4. Procedures for forest engineering, including:

- (a) drainage requirements;
- (b) conservation of buffer strips along streams and rivers;
- (c) protection of soils from compaction by harvesting machinery; and
- (d) protection of soil from erosion during harvesting operations

ATO (✓)

III.3.3. Soil and water restoration programs are implemented when necessary.

CILSS (✓)

5.2 Areas and percentages of forests and other wooded areas managed mainly for the production of water, protection of watersheds, riverine zones and for flood control

SADC (✓)

5.2 Areas and percentages of forests and other wooded areas managed mainly for the Production of water, protection of watersheds, riverine zones and for flood control.

Near East Process (✓)

5.2 Size and percentage of wooded areas managed mainly for the protection of watersheds

Montreal Process (✓)

4.3.a Proportion of forest management activities that meet best management practices, or other relevant legislation, to protect water related resources

4.3.b Area and percent of water bodies, or stream length, in forest areas with significant change in physical, chemical or biological properties from reference conditions.

CI 20. Monitor periodically key biotic and abiotic factors that might affect health and vitality of ecosystems

FSC (~)

10.7 The Organization shall use integrated pest management and silviculture systems which avoid, or aim at eliminating, the use of chemical pesticides. The Organization shall not use any chemical pesticides prohibited by FSC policy. When pesticides are used, The Organization shall prevent, mitigate, and / or repair damage to environmental values and human health.

PEFC (✓)

5.2.2 Health and vitality of forests shall be periodically monitored, especially key biotic and abiotic factors that potentially affect health and vitality of forest ecosystems, such as pests, diseases, overgrazing and overstocking, fire, and damage caused by climatic factors, air pollutants or by forest management operations.

Tarapoto FMU (✓)

10.3 Area and percentage of forest affected by processes or other natural agents (insect attack, disease, fire, etc.) and by human actions

ITTO FMU (✓)

3.2. Extent and nature of forest degradation and disturbance due to natural causes and the control procedures applied

Tarapoto CL (✓)

4.4 Area and percentage of forest affected by processes or other agents (insect attack, disease, fire, flooding etc.)

ITTO CL (✓)

3.2. Extent and nature of forest degradation and disturbance due to natural causes and the control procedures applied

ASI (✓)

2.3 Extent of forest area under: obnoxious weeds, pests and diseases of epidemic proportions

CILSS (✓)

3.1 Areas and percentages of forest (natural and man-made) modified, with the indication of severity of damage by such agents as: fires (including frequency), storms (e.g. wind throw, flooded areas), insects and diseases, damage by wild and domesticated animals, competition from introduced plants, drought, damage by wind erosion)

SADC (✓)

3.1 Areas and percentages of forest (natural and man-made) modified, with the indication of severity of damage by such agents as:

- fires (including frequency)
- storms (including wind throw, flooded areas)
- insects and diseases
- damage by wild and domesticated animals
- competition from introduced plants
- drought
- damage by wind erosion

Lepaterique CL (✓)

3.2. Area and percentage of forest affected by natural agents.

Near East Process (✓)

3.1 Areas and percentage of forest (plantations/natural forests) affected by:

- natural fires
- storms
- insects and diseases
- drought
- wild animals (game)

MCFPE (✓)

2.4 Forest damage Forest and other wooded land with damage, classified by primary damaging agent (abiotic, biotic and human induced) and by forest type

Montreal Process (✓)

3.a Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive alien species) beyond reference conditions

3.b Area and percent of forest affected by abiotic agents (e.g. fire, storm, land clearance) beyond reference conditions.

CI 23. Measures for soil conservation**FSC (✓)**

6.3 The Organization shall identify and implement effective actions to prevent negative impacts of management activities on the environmental values, and to mitigate and repair those that occur, proportionate to the scale, intensity and risk of these impacts.

PEFC (✓)

5.5.1 Forest management planning shall aim to maintain and enhance protective functions of forests for society, such as protection of infrastructure, protection from soil erosion, protection of water resources and from adverse impacts of water such as floods or avalanches.

5.5.3 Special care shall be given to silvicultural operations on sensitive soils and erosion-prone areas as well as in areas where operations might lead to excessive erosion of soil into watercourses. Inappropriate techniques such as deep soil tillage and use of unsuitable machinery shall be avoided in such areas. Special measures shall be taken to minimise the pressure of animal populations.

Tarapoto FMU (✓)

10.5 Soil conservation measures.

ITTO FMU (✓)

6.4. Procedures for forest engineering, including:

(a) drainage requirements;

(b) conservation of buffer strips along streams and rivers;

(c) protection of soils from compaction by harvesting machinery; and

(d) protection of soil from erosion during harvesting operations

Tarapoto CL (✓)

5.1 Measures for soil conservation.

ITTO CL (✓)

6.4. Procedures for forest engineering, including:

(a) drainage requirements;

(b) conservation of buffer strips along streams and rivers;

(c) protection of soils from compaction by harvesting machinery; and

(d) protection of soil from erosion during harvesting operations

ATO (✓)

III.3.2. Erosion and other forms of soil degradation are minimized.

Near East Process (✓)

5.4 Areas managed for soil protection

MCFPE (~)

5.1 Protective forests – soil, water and other ecosystem functions. Area of forest and other wooded land designated to prevent soil erosion, to preserve water resources, or to maintain other forest ecosystem functions, part of MCPFE Class “Protective Functions”

Montreal Process (✓)

4.2.a Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources.

CI 26. Promote gender equality

FSC (✓)

2.2 The Organization shall promote gender equality in employment practices, training opportunities, awarding of contracts, processes of engagement and management activities.

ASI (✓)

7.3 Gender Related Indices in Forestry (GDI in HDR of UNDP)

SADC (✓)

6.11 Benefits accruing to local communities (with particular emphasis on women and youth)

Lepaterique CL (✓)

8.3. Employment opportunities in forestry (direct, indirect) for women in local communities.

CI 27. Availability of a mutually agreed and documented system for dealing with complaints and grievances, which is implemented and accepted by all affected parties.

FSC (✓)

2.6 The Organization through engagement with workers shall have mechanisms for resolving grievances and for providing fair compensation to workers for loss or damage to property, occupational diseases, or occupational injuries sustained while working for The Organization

PEFC (✓)

5.6.10 Forest management shall provide for effective communication and consultation with local people and other stakeholders relating to sustainable forest management and shall provide appropriate mechanisms for resolving complaints and disputes relating to forest management between forest operators and local people

IITO FMU (✓)

7.5. Existence and implementation of conflict-resolution mechanisms for resolving disputes between forest stakeholders

ITTO CL (✓)

7.5. Existence and implementation of conflict-resolution mechanisms for resolving disputes between forest stakeholders.

CI 28. Use local processing, local services, and local value adding.

FSC (✓)

5.4 The Organization shall use local processing, local services, and local value adding to meet the requirements of The Organization where these are available, proportionate to scale, intensity and risk. If these are not locally available, The Organization shall make reasonable attempts to help establish these services.

4.3 The Organization shall provide reasonable opportunities for employment, training and other services to local communities, contractors and suppliers proportionate to scale and intensity of its management activities.

PEFC (✓)

5.6.9 Forest management practices shall make the best use of local forest-related experience and knowledge, such as those of local communities, forest owners, NGOs and local people.

ATO (✓)

IV.5.3. Forest-dependent people have opportunity to be employed and trained by forest companies.

CILSS (✓)

6.9. Employment generation and other social advantages

6.12. Employment, opportunities and other advantages created notably in rural areas.

SADC (✓)

6.9 Number of people employed in forest sector

6.11 Benefits accruing to local communities (with particular emphasis on women and youth)

Near East Process (✓)

7.7 Valorisation of local expertise, knowledge, and local technologies.

CI 29. Benefit sharing mechanism

Tarapoto FMU (~)

11.5 Nature and quantity of benefits deriving from forest management.

ITTO FMU (✓)

7.4. Existence and implementation of mechanisms for the equitable sharing of the costs and benefits of forest management

Tarapoto CL (✓)

1.3 Indicators of Cultural, Social and Spiritual Needs and Values (...)

- Level of participation of local populations in the management and in the benefits generated by forest activities.(...)

ITTO CL (✓)

7.4. Existence and implementation of mechanisms for the equitable sharing of the costs and benefits of forest management

ASI (✓)

8.10 Benefit sharing mechanism for stakeholders engaged in forest management activities

ATO (✓)

(Criterion IV.5 Sharing of benefits from the forest is considered equitable)

CILSS (~)

6.10 Degree of satisfaction to which social, cultural and spiritual needs are met

SADC (✓)

6.11 Benefits accruing to local communities (with particular emphasis on women and youth)

Lepaterique CL (✓)

8.11. Implementation of measures that assure equal distribution of benefits from access to and use of forest resources, with due consideration to gender issues.

Montreal Process (✓)

6.3.e Distribution of revenues derived from forest management.

CI 31. Rights of indigenous peoples & local communities -defined in the United Nations Declaration on the Rights of Indigenous Peoples (2007) and ILO Convention 169 (1989).

FSC (✓)

3.1 The Organization shall identify the indigenous peoples that exist within the Management Unit or are affected by management activities. The Organization shall then, through engagement with these indigenous peoples, identify their rights of tenure, their rights of access to and use of forest resources and ecosystem services, their customary rights and legal rights and obligations that apply within the Management Unit. The Organization shall also identify areas where these rights are contested.

The Organization shall also identify areas where these rights are contested.

3.2 The Organization shall recognize and uphold the legal and customary rights of indigenous peoples to maintain control over management activities within or related to the Management Unit to the extent necessary to protect their rights, resources and lands and territories. Delegation by indigenous peoples of control over management activities to third parties requires Free, Prior and Informed Consent.

3.4 The Organization shall recognize and uphold the rights, customs and culture of indigenous peoples as defined in the United Nations Declaration on the Rights of Indigenous Peoples (2007) and ILO Convention 169 (1989).

4.1 The Organization shall identify the local communities that exist within the Management Unit and those that are affected by management activities. The Organization shall then, through engagement with these local communities, identify their rights of tenure, their rights of access to and use of forest resources and ecosystem services, their customary rights and legal rights and obligations, that apply within the Management Unit.

4.2 The Organization shall recognize and uphold the legal and customary rights of local communities to maintain control over management activities within or related to the Management Unit to the extent necessary to protect their rights, resources, lands and territories. Delegation by local communities of control over management activities to third parties requires Free, Prior and Informed Consent.

PEFC (✓)

5.6.4 Forest management activities shall be conducted in recognition of the established framework of legal, customary and traditional rights such as outlined in ILO 169 and the UN Declaration on the Rights of Indigenous Peoples, which

shall not be infringed upon without the free, prior and informed consent of the holders of the rights, including the provision of compensation where applicable. Where the extent of rights is not yet resolved or is in dispute there are processes for just and fair resolution. In such cases forest managers shall, in the interim, provide meaningful opportunities for parties to be engaged in forest management decisions whilst respecting the processes and roles and responsibilities laid out in the policies and laws where the certification takes place.

ITTO FMU (✓)

7.12. Extent to which tenure and user rights of communities and indigenous peoples over publicly owned forests are recognized and practised

ITTO CL (✓)

7.12. Extent to which tenure and user rights of communities and indigenous peoples over publicly owned forests are recognized and practised

Lepaterique CL (✓)

8.9. Instrumentalisation to guarantee the proper application of international agreements and contracts in relation to the recognition of indigenous property rights. (United Nations International Labour Organization, Convention 169).

8.10. Fulfilment of commitments related to international agreements and conventions on indigenous rights (ILO Convention 169).

CI 32. Existence of conflict management mechanisms

FSC (✓)

4.6 The Organization, through engagement with local communities, shall have mechanisms for resolving grievances and providing fair compensation to local communities and individuals with regard to the impacts of management activities of The Organization.

1.6 The Organization shall identify, prevent and resolve disputes over issues of statutory or customary law, which can be settled out of court in a timely manner, through engagement with affected stakeholders.

PEFC (✓)

5.6.11 Forestry work shall be planned, organised and performed in a manner that enables health and accident risks to be identified and all reasonable measures to

be applied to protect workers from work-related risks. Workers shall be informed about the risks involved with their work and about preventive measures.

ITTO FMU (✓)

7.5. Existence and implementation of conflict-resolution mechanisms for resolving disputes between forest stakeholders.

ITTO CL (✓)

7.5. Existence and implementation of conflict-resolution mechanisms for resolving disputes between forest stakeholders

ASI (✓)

8.11 Existence of conflict management mechanisms

CILSS (✓)

7.2 Existence of a comprehensive legislative and regulatory framework providing, e.g. equitable access to resources, alternative forms of conflict resolution and consideration of land occupancy and cultural rights of local populations

SADC (✓)

7.2 Existence of a comprehensive legislative and regulatory framework providing, e.g. equitable access to resources, alternative forms of conflict resolution and consideration of land occupancy and cultural rights of local populations

Montreal Process (✓)

7.5.b Public participation and conflict resolution in forest-related decision making.

CI 33. Traditional knowledge

FSC (✓)

3.6 The Organization shall uphold the right of indigenous peoples to protect and utilise their traditional knowledge and shall compensate indigenous peoples for the utilization of such knowledge and their intellectual property. A binding agreement as per Criterion 3.3 shall be concluded between The Organization and the indigenous peoples for such utilization through Free, Prior and Informed Consent before utilization takes place and shall be consistent with the protection of intellectual property rights.

4.8 The Organization shall uphold the right of local communities to protect and utilise their traditional knowledge and shall compensate local communities for the utilization of such knowledge and their intellectual property. A binding agreement as per Criterion 3.3 shall be concluded between The Organization and the local communities for such utilization through Free, Prior and Informed Consent before utilization takes place, and shall be consistent with the protection of intellectual property rights.

PEFC (✓)

5.6.9 Forest management practices shall make the best use of local forest-related experience and knowledge, such as those of local communities, forest owners, NGOs and local people.

ITTO FMU (✓)

7.13. Extent to which indigenous knowledge is used in forest management planning and implementation

Tarapoto CL (✓)

6.5 Mechanisms for remuneration for traditional knowledge.

ITTO CL (✓)

7.13. Extent to which indigenous knowledge is used in forest management planning and implementation

ASI (✓)

7.4 Degree of application of traditional knowledge

CILSS (✓)

7.6 Valorisation of local expertise, knowledge and technologies

SADC (✓)

7.6 Valorisation of local expertise, knowledge and technologies.

CI 34. Negotiations concerning compensation for loss of legal, customary or user rights are dealt with through a documented system that enables indigenous peoples, local communities and other stakeholders to express their views through their own representative institutions as free, prior and informed consent and negotiated agreement

FSC (✓)

3.6 The Organization shall uphold the right of indigenous peoples to protect and utilise their traditional knowledge and shall compensate indigenous peoples for the utilization of such knowledge and their intellectual property. A binding agreement as per Criterion 3.3 shall be concluded between The Organization and the indigenous peoples for such utilization through Free, Prior and Informed Consent before utilization takes place and shall be consistent with the protection of intellectual property rights.

PEFC (✓)

5.6.4 Forest management activities shall be conducted in recognition of the established framework of legal, customary and traditional rights such as outlined in ILO 169 and the UN Declaration on the Rights of Indigenous Peoples, which shall not be infringed upon without the free, prior and informed consent of the holders of the rights, including the provision of compensation where applicable. Where the extent of rights is not yet resolved or is in dispute there are processes for just and fair resolution. In such cases forest managers shall, in the interim, provide meaningful opportunities for parties to be engaged in forest management decisions whilst respecting the processes and roles and responsibilities laid out in the policies and laws where the certification takes place.

CI 35. Fair Pricing and Transparent Contracts

ATO (~)

Criterion IIA.2. Planning and implementation of logging are carried out in conformity with guide-lines of the management plan and the contract agreement based on technical and social standards as well as financial specifications.

CI 36. Training and requalification of the workforce

FSC (✓)

4.3 The Organization shall provide reasonable opportunities for employment, training and other services to local communities, contractors and suppliers proportionate to scale and intensity of its management activities

PEFC (✓)

5.6.1 Forest management planning shall aim to respect the multiple functions of forests to society, give due regard to the role of forestry in rural development, and especially consider new opportunities for employment in connection with the socio-economic functions of forests. Note: The stimulation of rural development could be achieved by training and employment of local people, including indigenous people, a preference for the local processing of ti

5.6.8 Forest managers, contractors, employees and forest owners shall be provided with sufficient information and encouraged to keep up-to-date through continuous training in relation to sustainable forest management as a precondition for all management planning and practices described in this standard.

ITTO FMU (✓)

7.5. Training, capacity-building and manpower development programs for forest workers.

ITTO CL (✓)

7.5. Training, capacity-building and manpower development programs for forest workers

ATO (✓)

IV.5.3. Forest-dependent people have opportunity to be employed and trained by forest companies.

Lepaterique (✓)

7.3. Investment in forestry research, training and education and in technology transfer.

CI 37. Value of the products (this includes the value and volume of production and/or the value added / ton).

ITTO FMU (✓)

7.2. Value of domestically produced wood, non-wood forest products and environmental services in:

- (a) domestic markets;
- (b) export markets; and
- (c) informal markets including subsistence and illegal activities (estimate)

ITTO CL (✓)

7.2. Value of domestically produced wood, non-wood forest products and environmental services in:

- (a) domestic markets;
- (b) export markets; and
- (c) informal markets including subsistence and illegal activities (estimate)

CILSS (✓)

6.5. Value from primary and secondary industries

SADC (✓)

6.5 Value from secondary industries

Lepaterique CL (✓)

8.2. Contribution of environmental services, and of wood and non-wood forest products to the GNP.

MCFPE (✓)

3.2 Roundwood Value and quantity of marketed roundwood

3.3 Non-wood goods Value and quantity of marketed non-wood goods from forest and other wooded land

Montreal Process (✓)

6.1.a Value and volume of wood and wood products production, including primary and secondary processing.

CI 38. Means for research

PEFC (✓)

5.6.14 Forest management shall be based inter-alia on the results of scientific research. Forest management shall contribute to research activities and data collection needed for sustainable forest management or support relevant research activities carried out by other organisations, as appropriate.

Tarapoto CL (✓)

6.4 Quantity and quality of research and sustainable development in execution.

ASI (✓)

8.3 Investment in forestry research and development

ATO (✓)

0.2.3. Forest research is allocated sufficient means (human and material) and its results are applied.

IIA.1.1. Adequate effort of investigation is undertaken to define, validate or adjust silvicultural and work standards

CILSS (✓)

7.4 Research and development capacity

Lepaterique CL (✓)

1.9. Providing means to stakeholders and local governments to strengthen their involvement in, and support to, sustainable forest management.

7.3. Investment in forestry research, training and education and in technology transfer.

Near East Process (✓)

7.6 Research and extension capacity

Montreal Process (✓)

6.2.b Annual investment and expenditure in forest-related research, extension and development, and education

7.4.b Development and application of research and technologies for the sustainable management of forests.

CI 39. Incentives for investments

ITTO FMU (✓)

1.4. Existence and implementation of economic instruments and other incentives to encourage sustainable forest management

ITTO CL (✓)

1.4. Existence and implementation of economic instruments and other incentives to encourage sustainable forest management

ASI (✓)

8.9 Fiscal and monetary incentives for investing in forestry activity

CILSS (✓)

7.5 Existence of incentives for investments in the forestry sector

SADC (✓)

7.5 Existence of incentives for investments in the forestry sector.

3.2 Agricultural schemes

In Table 8 the benchmark and gap analysis of the selected agricultural schemes against the identified Complementary indicators is shown. This Table shows the complementary indicators that were meaningfully reflected in the analysed schemes.

Table 8 Benchmark and Gap Analysis of the selected Agriculture Schemes against the identified Complementary Indicators (meaningfully reflected in the analysed schemes)

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	SAFA	SAN	RSPO	RTRS	Bonsucro	CAP
Theme 1: Environment	1	Waste	1	Waste management and reduction, recycle and re-use of waste	✓	✓	✓	✓	✓	
			2	Waste generation per ton of product	✓	✓	~	~	✓	
	2	Best environmental practices	3	“Responsible” management of wastewater	✓	✓				
			4	No use of burning	~	~	✓	✓		✓
			5	Responsible management infrastructural development, transport activities and silviculture	~		✓	~		
	3	Land Use and Land Use Change	6	Assure the permanence of vegetation (regenerate vegetation cover)				~		
			7	Rehabilitate degraded ecosystems	✓	~				
			8	Land Use Change	✓	✓	✓	✓	✓	

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	SAFA	SAN	RSPO	RTRS	Bonsucro	CAP
	4	Sustainable harvesting of forest products and non-wood forest products	9	Harvest products and services from the Management Unit at or below a level which can be permanently sustained			~	~		
C1: Resource efficiency	5	Resource use	10	Efficiency of systems of production and transformation	~	✓	~		✓	
			11	Intensity of fossil fuel use	~		✓	✓		
C1: Resource efficiency	6	Best Practices for Resource Efficiency	12	Energy saving practices	✓	✓	✓		✓	
C2: Climate change	7	Best Environmental Practices for Climate Change reduction	13	Practices to diminish GHG emissions	✓	✓	✓	✓		
			14	Practices to increase carbon dioxide sequestration	✓	✓	✓	✓	~	
	8	Climate change	15	Maintenance of forest contribution to global carbon cycles						
C3: Biodiversity	9	Best Environmental Practices for Biodiversity conservation	16	Practices to diminish spread of invasive introduced species and new pests or diseases	✓	✓	✓	✓		✓
			17	"Responsible" application of agrochemicals (in the case of forestry minimize or eliminate) and biological control agents	✓	✓	✓	✓	✓	✓

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	SAFA	SAN	RSPO	RTRS	Bonsucro	CAP
			18	Avoid harvesting of threatened or endangered plant species	✓	✓	✓	✓	✓	
	10	Other indicators for biodiversity conservation	19	Maintain or restore of areas of water influence	✓	✓	✓	✓		✓
			20	Monitor periodically key biotic and abiotic factors that might affect health and vitality of ecosystems			~	✓		
C4:Soils	11	Best Environmental Practices	21	Avoid planting in certain areas to protect soils	~		✓			
	12	Other considerations for soil conservation	22	Soil surface mechanically tilled per year (% of cultivated area)					✓	
			23	Measures for soil conservation	✓	✓	✓	✓	✓	~
			24	pH (Percentage fields with samples showing analyses within acceptable limits for pH)	✓				✓	
C5: Water	13	Best environmental practices	25	Avoid natural water contamination	✓	✓	✓	✓	✓	
Theme 2: Social	14	Social wellbeing	26	Promote gender equality	✓	~	~			
Theme2: Social	15	Social wellbeing	27	Availability of a mutually agreed and documented system for dealing with complaints and grievances, which is implemented and accepted by affected parties	✓	✓	✓	✓	✓	

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	SAFA	SAN	RSPO	RTRS	Bonsucro	CAP
			28	Use local processing, local services, and local value adding.	✓	✓	✓	✓		
			29	Benefit sharing mechanism	✓		✓			
			30	Support to Vulnerable People	✓		~			
Theme 2: Social	16	Rights of indigenous peoples & local communities	31	Rights of indigenous peoples & local communities -defined in the United Nations Declaration on the Rights of Indigenous Peoples (2007) and ILO Convention 169 (1989).	✓					
			32	Existence of conflict management mechanisms	✓		✓	✓	✓	
T2: Social	17	Traditional knowledge	33	Traditional knowledge	✓					
C7: Participation and transparency	18	Documented system for participatory processes	34	Negotiations concerning compensation for loss of legal, customary or user rights are dealt with through a documented system that enables indigenous peoples, local communities and other stakeholders to express their views through their own representative institutions as free, prior and informed consent and negotiated agreements	✓		✓	✓		
9. Employment and labour conditions	19	Employment and labour conditions	35	Fair pricing and transparent contracts	✓		✓	✓	✓	
			36	Training and requalification of the workforce	✓	✓	✓	✓	✓	

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	SAFA	SAN	RSPO	RTRS	Bonsucro	CAP
Theme 3: Economic	20	Economic	37	Value of products (includes value and volume of production and/or value added per ton)			✓		✓	
			38	Means for research		~			✓	
			39	Incentives for investments						

CI 1. Waste Management and reduction, recycle and re-use of waste

SAFA (✓)

E 5.3.1. Waste Reduction Target

E.5.3.2. Waste Reduction Practices

E 5.3.3. Waste Disposal

E.5.3.4. Food Loss and Waste Reduction

SAN (✓)

10.1 The farm must have an integrated waste management program for the waste products it generates. This must be based on the concepts of refusing or reducing the use of products that have actual or potential negative impacts on the environment or human health as well as reusing and recycling waste. As part of this program, the sources and types of waste must be identified and the quantity (weight or volume) must be estimated. The activities of the integrated waste management program must be in accordance with the types and quantities of waste generated.

10.2 The use of open waste dumps and open-air burning of waste is not permitted. The burning of waste products is only allowed in an incinerator designed for that purpose, based on technical studies that determined the size, optimum location and control measures for minimizing the environmental and human health impacts related to its construction and operation. The farm must have the relevant legal permits for the construction and operation of this incinerator, as well as the appropriate operating procedures.

10.3 The final or semi-permanent waste deposit areas on the farm must be designed and managed to reduce the risks of environmental contamination and damage to human health. Its location must be in accordance with applicable laws regarding distances from houses and other areas of human activity, water channels and sources, and conservation areas. The farm must have identified the sites and designs that are technically suitable for the final deposit or processing of both organic and inorganic waste through an evaluation of site characteristics, the volume and type of waste to be eliminated or treated, and potential impacts.

10.4 Farms must not transfer waste to persons or businesses without checking that its treatment or final use complies with legal requirements and the requirements of this standard. Waste products or materials that have been in contact with agrochemicals or any other toxic or harmful substances must not be given away without first verifying that they will be used for similar purposes that

do not represent a danger to human health or produce negative environmental impacts.

10.5 The farm must be clean and free of accumulations of all types of waste products in order to maintain a positive image and contribute to the workers' well-being. The farm must regularly implement educational activities for farm workers and residents with the objective of promoting cleanliness and preventing the indiscriminate disposal of waste. The farm must strategically place waste receptacles on the farm and regularly collect and dispose of their contents.

RSPO (✓)

(Criterion 5.3. Waste is reduced, recycled, re-used and disposed of in an environmentally and socially responsible manner).

RTRS (✓)

(Criterion 4.2. 4.2 Pollution is minimized and production waste is managed responsibly)

4.2.2 There is adequate storage and disposal of fuel, batteries, tires, lubricants, sewage and other waste.

4.2.3 There are facilities to prevent spills of oil¹ and other pollutants.

4.2.4 Re-use and recycling are utilised wherever possible.

4.2.5 There is a residue management plan including all areas of the property.

5.5.2. Containers are properly stored, washed and disposed of; waste and residual agrochemicals are disposed in an environmentally appropriate way.

Bonsucro (✓)

5.5.3. Percentage of categories of non-production waste that is recycled.

CI 2. Waste production per ton of product

SAFA (✓)

E 5.3.1. Waste Reduction Target

E 5.3.2. Waste Reduction Practices

SAN (✓)

10.1 The farm must have an integrated waste management program for the waste products it generates. This must be based on the concepts of refusing or reducing the use of products that have actual or potential negative impacts on the environment or human health as well as reusing and recycling waste. As part of this program, the sources and types of waste must be identified and the quantity (weight or volume) must be estimated. The activities of the integrated waste management program must be in accordance with the types and quantities of waste generated.

RSPO (~)

4.2.4 A nutrient recycling strategy shall be in place, and may include use of Empty Fruit Bunches (EFB), Palm Oil Mill Effluent (POME), and palm residues after replanting.

RTRS (~)

(4.2 Pollution is minimized and production waste is managed responsibly)

4.2.1 There is no burning on any part of the property of crop residues, waste, or as part of vegetation clearance, except under one of the following conditions:

- a) Where there is a legal obligation to burn as a sanitary measure;
- b) Where it is used for generation of energy including charcoal production and for drying crops;
- c) Where only small-caliber residual vegetation from land clearing remains after all useable material has been removed for other uses.

4.2.2 There is adequate storage and disposal of fuel, batteries, tires, lubricants, sewage and other waste.

4.2.3 There are facilities to prevent spills of oil¹ and other pollutants.

4.2.4 Re-use and recycling are utilised wherever possible.

4.2.5 There is a residue management plan including all areas of the property.

Bonsucro (✓)

5.5.2. Nonhazardous solid residues of production per ton cane.

CI 3. Responsible management of waste water

SAFA (✓)

E 2.2.4. Wastewater Quality

E 2.2.2. Water Pollution Prevention Practices. (...) Many practices can prevent and/ or reduce water pollution, for example management practices that control the volume and flow rate of runoff water, soil conservation practices, the proper storage and application of manure, slurry and silage, and appropriate facility wastewater and runoff management.

SAN (✓)

4.4. The farm must have appropriate treatment systems for all wastewaters it generates. The treatment systems must comply with applicable national and local laws and have the respective operating permits. There must be operating procedures for industrial wastewater treatment systems. All packing plants must have waste traps that prevent the discharge of solids from washing and packing into canals and water bodies.

4.8. The farm must restrict the use of septic tanks to the treatment of domestic wastewater (grey water and sewage) and non-industrial wastewater to prevent negative impacts on underground or surface water. The tanks and their drainage systems must be located in soils suitable for this purpose. Their design must coincide with the volume of wastewater received and treatment capacity, and must permit periodic inspections. Wastewater from the washing of machinery used for agrochemical applications must be collected and must not be mixed with domestic wastewater or discharged to the environment without previous treatment.

CI 4. No use of burning

SAFA (~)

E 1.2.2. Prevention Practices: This indicator refers to all practices that aim at preventing the release of air pollutants from food and agriculture supply chains. (...) Forest fires, including the intentional burning of forests to facilitate conversion to agricultural land uses, are a major source of air pollution.

SAN (✓)

8.9. The use of fire for pest and disease management must only be used if it is the option of less environmental impact in comparison with other pest control measures. This option must be approved by competent authorities, must reflect technical considerations and focus on problematic areas only.

9.4. The farm must promote the use of fallow areas with natural or planted vegetation in order to recover natural fertility and interrupt pest life cycles. The farm must have a plan that indicates the fallow techniques or practices (planting, natural regeneration, etc.) and their timing. These areas must be identified in the fields and on the farm map. Burning is not allowed to prepare land.

10.2 The use of open waste dumps and open-air burning of waste is not permitted. The burning of waste products is only allowed in an incinerator designed for that purpose, based on technical studies that determined the size, optimum location and control measures for minimizing the environmental and human health impacts related to its construction and operation. The farm must have the relevant legal permits for the construction and operation of this incinerator, as well as the appropriate operating procedures.

RSPO (✓)

(Criterion 5.5. Use of fire for preparing land or replanting is avoided, except in specific situations as identified in the ASEAN guidelines or other regional best practice)

(Criterion 7.7. No use of fire in the preparation of new plantings other than in specific situations, as identified in the ASEAN guidelines or other regional best practice)

RTRS (✓)

4.2.1. There is no burning on any part of the property of crop residues, waste, or as part of vegetation clearance, except under one of the following conditions:

- a) Where there is a legal obligation to burn as a sanitary measure;
- b) Where it is used for generation of energy including charcoal production and for drying crops;
- c) Where only small-caliber residual vegetation from land clearing remains after all useable material has been removed for other uses.

CAP (✓)

EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Soil and Carbon Stock. Maintenance of soil organic matter level through appropriate practices including ban on burning arable stubble, except for plant health reasons.

CI 5. Responsible management infrastructural development, transport activities and silviculture

SAFA (~)

7.4 The farm must contribute to the protection and conservation of community natural resources, collaborate with the development of the local economy, and contribute fairly towards the costs of the community infrastructure and local shared resources consumed – schools, pathways, aqueducts and other infrastructure as well as water and other resources – according to the amount used by the farm. Farms must negotiate a fair compensation with local communities and local and national authorities for resources and infrastructure used.

RSPO (✓)

- 5.1.1 (M) An environmental impact assessment (EIA) shall be documented.
- Guidance:
- The EIA should cover the following activities, where they are undertaken:
- Building new roads, processing mills or other infrastructure; (...)

RTRS (~)

4.1.1 A social and environmental assessment is carried out prior to the establishment of large or high risk new infrastructure.

CI 6. Assure the permanence of vegetation (regenerate vegetation cover)

RTRS (~)

4.3.4 Opportunities for increasing carbon sequestration through restoration of native vegetation, forest plantations and other means are identified.

CI 7. Rehabilitate degraded ecosystems

SAFA (✓)

E 3.2.2. Land Conservation and Rehabilitation Practices. This indicator refers to all practices that aim at preventing the loss of productive soils and at rehabilitating degraded soils

SAN (~)

(Principle 2. ECOSYSTEM CONSERVATION: Summary of the principle (not binding for audit purposes): Natural ecosystems are integral components of the agricultural and rural countryside. Carbon capture, crops pollination, pest control, biodiversity and soil and water conservation are just some of the services provided by natural ecosystems on farms. Certified farms protect these natural ecosystems and conduct activities to restore degraded ecosystems (...))

CI 8. Land conversion into production areas

SAFA (✓)

E 4.1.5. Land Use and Land Cover Change: This indicator measures whether natural or near-natural habitats (e.g. wetlands, primary forests, grasslands, protected waterways, mangrove forests) or structurally complex land use systems (e.g. grasslands, agroforestry, polycultures) have been replaced by ecologically less valuable forms of land use or land cover due to the enterprise's operations during the last 20 years.

SAN (✓)

9.5. Critical Criterion. New production areas must only be located on land with the climatic, soil and topographic conditions suitable for intensity level of the agricultural production planned. The establishment of new production areas must be based on land use capacity studies that demonstrate long-term production capacity. The cutting of natural forest cover or burning to prepare new production areas is not permitted.

RSPO (✓)

7.3.2 (M) A comprehensive HCV assessment, including stakeholder consultation, shall be conducted prior to any conversion or new planting. This shall include a land use change analysis to determine changes to the vegetation since November 2005. This analysis shall be used, with proxies, to indicate changes to HCV status.

RTRS (✓)

(Criterion 2.1 There is no conversion of high biodiversity areas)

2.1.1 There is evidence to confirm in January 2008, the land currently under soy cultivation did not have any of the following statuses:

- primary forest

(Criterion 4.4 Expansion of soy cultivation is responsible)

Note: This criterion will be revised after June 2012 if RTRS-approved maps and system are not available.

4.4.1. After May 2009 expansion for soy cultivation has not taken place on land cleared of native habitat except under the following conditions:

4.4.1.1 It is in line with an RTRS-approved map and system (see Annex 4.)

or

4.4.1.2 Where no RTRS-approved map and system is available:

a) Any area already cleared for agriculture or pasture before May 2009 and used for agriculture or pasture within the past 12 years can be used for soy expansion, unless regenerated vegetation has reached the definition of native forest (see glossary).

b) There is no expansion in native forests (see glossary)

c) In areas that are not native forest (see glossary), expansion into native habitat only occurs according to one of the following two options:

Option 1. Official land-use maps such as ecological-economic zoning are used and expansion only occurs in areas designated for expansion by the zoning. If there are no official land use maps then maps produced by the government under the Convention on Biological Diversity (CBD) are used, and expansion only occurs outside priority areas for conservation shown on these maps.

Option 2. An High Conservation Value Area (HCVA) assessment is undertaken prior to clearing and there is no conversion of High Conservation Value Areas.

Note: Where neither official land use maps nor CBD maps exist, Option 2 must be followed.

4.4.2 There is no conversion of land where there is an unresolved land use claim by traditional land users under litigation, without the agreement of both parties.

Bonsucro (~)

5.7.1 Percentage of greenfield expansion or new sugarcane project covered by ESIA.

CI 9. Harvest products and services from the Management Unit at or below a level which can be permanently sustained

RSPO (~)

4.2.4 A nutrient recycling strategy shall be in place, and may include use of Empty Fruit Bunches (EFB), Palm Oil Mill Effluent (POME), and palm residues after replanting.

RTRS (~)

4.2.5 There is a residue management plan including all areas of the property.

CI 10. Efficiency of systems of production and transformation

SAFA (~)

E 2.1.2. Water Conservation Practices. This indicator refers to all practices that aim at saving water in agriculture and fisheries-based food chains. Water conservation refers to any beneficial reduction of water loss, use or waste. Many practices can potentially conserve water, such as maximizing the efficiency of irrigation systems, rainwater harvesting, cultivation of water-efficient crops, use of less water-demanding processing technologies, etc

SAN (✓)

10.6. The farm must implement practices to diminish its emissions of greenhouse gases and increase carbon dioxide sequestration. Such practices include soil cover management, planting trees and other perennial vegetation, proper sourcing and management of fertilisers and fuels, management of effluent ponds and manure, proper waste management, use of clean technologies, improvement of energy efficiency, reduction in tillage, and participation in local or regional initiatives aimed at greenhouse gas reduction and carbon dioxide sequestration.

RSPO (~)

6.11.2 Where there are scheme smallholders, there shall be evidence that efforts and/or resources have been allocated to improve smallholder productivity.

Bonsucro (✓)

3.1.1. Total raw materials used per kg product

5.3.2. Fermentable total sugars content of cane, expressed as invert (TSAI)

(Criterion 5.4 To promote energy efficiency)

5.4.1 Total Net Primary Energy Usage per kg product

5.4.2 Energy used in cane transport per ton cane transported

5.4.3 Primary energy use per ton of sugarcane.

CI 11. Total direct fossil fuel use over time

RSPO (✓)

5.4.1 A plan for improving efficiency of the use of fossil fuels and to optimise renewable energy shall be in place and monitored. Guidance:

- Renewable energy use per ton of Crude Palm Oil (CPO) or palm product in the mill should be monitored.
- Direct fossil fuel use per ton of CPO or Fresh Fruit Bunches (FFB) should be monitored. (...)

RTRS (✓)

4.3.1 Total direct fossil fuel use over time is recorded, and its volume per hectare and per unit of product for all activities related to soy production is monitored.

4.3.2 If there is an increase in the intensity of fossil fuel used, there is a justification for this. If no justification is available there is an action plan to reduce use

CI 12. Energy Saving Practices: Energy use reduction, preferably by enhancing energy efficiency

SAFA (✓)

E 5.2.2. Energy Saving Practices

To achieve a sustainable energy use in food and agriculture value chains, energy use will need to be reduced, preferably by enhancing energy efficiency, and the energy system needs to be reverted to renewable and sustainable energy sources. This indicator serves to check for practices that reduce the energy needs of the analysed enterprise, both in absolute terms and per unit of produce.

SAN (✓)

10.6. The farm must implement practices to diminish its emissions of greenhouse gases and increase carbon dioxide sequestration. Such practices include (...) improvement of energy efficiency, reduction in tillage, and participation in local or regional initiatives aimed at greenhouse gas reduction and carbon dioxide sequestration.

RSPO (✓)

5.4.1. A plan for improving efficiency of the use of fossil fuels and to optimise renewable energy shall be in place and monitored.

Bonsucro (✓)

(Criterion 5.4 To promote energy efficiency)

5.4.1 Total Net Primary Energy Usage per kg product

5.4.2 Energy used in cane transport per ton cane transported

Primary energy use per ton of sugarcane.

CI 13. Practices to diminish GHG emissions

SAFA (✓)

E.1.1.2. GHG Mitigation Practices. This indicator refers to all practices that aim at reducing the GHG emissions from food and agriculture systems

SAN (✓)

10.6. The farm must implement practices to diminish its emissions of greenhouse gases and increase carbon dioxide sequestration. Such practices include soil cover management, planting trees and other perennial vegetation, proper sourcing and management of fertilisers and fuels, management of effluent ponds and manure, proper waste management, use of clean technologies, improvement of energy efficiency, reduction in tillage, and participation in local or regional initiatives aimed at greenhouse gas reduction and carbon dioxide sequestration.

RSPO (✓)

(Criterion 7.8. New plantation developments are designed to minimise net greenhouse gas emissions)

7.8.1 (M) The carbon stock of the proposed development area and major potential sources of emissions that may result directly from the development shall be identified and estimated.

7.8.2 There shall be a plan to minimise net GHG emissions which takes into account avoidance of land areas with high carbon stocks and/or sequestration options.

RTRS (✓)

(Criterion 4.3. Efforts are made to reduce emissions and increase sequestration of Greenhouse Gases (GHGs) on the farm).

CI 14. Practices to increase carbon dioxide sequestration

SAFA (✓)

E 1.1.3. GHG Balance: GHG Balance refers to the difference between the direct (and indirect) GHG emissions and the on-site sequestration by the enterprise. Direct GHG emissions are emissions from sources that are owned or controlled by the enterprise. On-site sequestration refers to practices such as afforestation and enrichment of soils with soil carbon on the sites of the enterprise.

SAN (✓)

10.6. The farm must implement practices to diminish its emissions of greenhouse gases and increase carbon dioxide sequestration. Such practices include soil cover management, planting trees and other perennial vegetation, proper sourcing and management of fertilisers and fuels, management of effluent ponds and manure, proper waste management, use of clean technologies, improvement of energy efficiency, reduction in tillage, and participation in local or regional initiatives aimed at greenhouse gas reduction and carbon dioxide sequestration.

RSPO (✓)

7.8.2. There shall be a plan to minimise net GHG emissions which takes into account avoidance of land areas with high carbon stocks and/or sequestration options.

RTRS (✓)

4.3.3 Soil organic matter is monitored to quantify change in soil carbon and steps are taken to mitigate negative trends.

4.3.4. Opportunities for increasing carbon sequestration through restoration of native vegetation, forest plantations and other means are identified.

CI 16. Practices to diminish spread of invasive introduced species and new pests or diseases

SAFA (✓)

E 4.2.3. Diversity and Abundance of Key Species: This indicator serves to determine how diversity and abundance of threatened and vulnerable wild species on the one hand, and invasive species on the other, have developed in, and adjacent to, the enterprise's operations during the analysed time-frame.

SAN (✓)

8.1 The farm must have an integrated pest-management program based on ecological principles for the control of harmful pests (insects, plants, animals and microbes). The program must give priority to the use of physical, mechanical, cultural and biological control methods, and the least possible use of agrochemicals. The program must include activities for monitoring pest populations, training personnel that monitor these populations, and integrated pest management techniques. As part of the program, the farm must collect and record the following information about pest infestations: infestation dates, duration, area and location; type of pest; the control mechanisms employed; environmental factors during the infestation; and damage caused and estimated costs of damage and control.

RSPO (✓)

(Criterion 4.5. Pests, diseases, weeds and invasive introduced species are effectively managed using appropriate Integrated Pest Management techniques)

RTRS (✓)

(Criterion 5.8. Systematic measures are planned and implemented to monitor, control and minimize the spread of invasive introduced species and new pests)

5.8.1 Where there are institutional systems in place to identify and monitor invasive introduced species and new pests, or major outbreaks of existing pests, producers follow the requirements of these systems, to minimize their spread.

5.8.2 Where such systems do not exist, incidences of new pests or invasive species and major outbreaks of existing pests are communicated to the proper authorities and relevant producer organizations or research organizations

(Criterion 5.11. Origin of seeds is controlled to improve production and prevent introduction of new diseases)

5.11.1 All purchased seed must come from known legal quality sources.

5.11.2 Self-propagated seeds may be used, provided appropriate seed production norms are followed and legal requirements regarding intellectual property rights are met.

CAP (✓)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Landscape, minimum level of maintenance. Retention of landscape features, including where appropriate, hedges, ponds, ditches, trees in line, in group or isolated, field margins and terraces, and including a ban on cutting hedges and trees during the bird breeding and rearing season and, as an option, measures for avoiding invasive plant species.

CI 17. Responsible application of agrochemicals and biological control agents

SAFA (✓)

C.3.1.2. Hazardous Pesticides: This indicator measures whether any of the enterprise' employees has handled, stored or used any highly hazardous and other pesticides during the last five years, as well the use of biological or mechanical pest management techniques

E.5.1.2. Nutrient Balance: To optimize the efficiency of nutrient use and prevent unproductive nutrient losses that pollute the environment, nutrient surpluses and deficiencies should be prevented at the enterprise and parcel/site levels. Therefore, operations in primary production should monitor and out-balance their supply/demand (or imports and exports) of nutrients.

SAN (✓)

8.2 The farm must demonstrate by comparative agrochemical inventories and use records that it rotates chemical products and reduces their use for crop production. The agrochemical inventory on the farm must include, as a minimum requirement, the commercial and generic product names, the quantities acquired and the purchase dates. For field applications, the farm must record the following information: (...)

8.3 The farm must implement the procedures and have the necessary equipment for mixing and applying agrochemicals, as well as maintain, calibrate and repair application equipment, in order to reduce to a minimum waste and excessive applications. The farm must designate and train personnel who will be responsible for the implementation of these procedures.

8.4 Critical Criterion. The following chemical or biological substances cannot be used on certified farms:

- a. Biological or organic substances that are not legally registered in the country for commercial use.
- b. Agrochemicals that are not registered officially in the country.
- c. Agrochemicals that are mentioned in the List of Banned and Severely Restricted Pesticides in the U.S. by its Environmental Protection Agency (EPA) or pesticides banned or severely restricted in the European Union.
- d. Substances that have been banned globally under the Stockholm Convention on Persistent Organic Pollutants (POPs).
- e. Substances listed in Annex III of the Rotterdam Convention on Prior Informed Consent (PIC), in relation to national bans or severe restrictions for documented health or environmental reasons in at least two regions of the World.
- f. All Pesticide Action Network Dirty Dozen substances.

List of Prohibited Pesticides – Sustainable Agriculture Network is binding for the inserts 8.4.c, 8.4.d, 8.4.e and 8.4.f of this criterion.

8.5 The farm must have a plan for eliminating the use of World Health Organization Class Ia and Ib technical grade active ingredients of pesticides, and for reducing the use of World Health Organization Class II technical grade active ingredients of pesticides (see Annex 3). Farms that do use the formerly mentioned ingredients must demonstrate the following: (...)

8.7. Farms must only use fumigation methods for post-harvest treatment that minimize health effects in workers and control applications. Records must be maintained of any post-harvest treatment. These records must at least include the following information: treatment application date, lot or batch number, the active ingredient's name of the applied product, dose, and the names of the persons who applied and mixed the product(s) and approved the application.

RSPO (✓)

4.2.2 Records of fertiliser inputs shall be maintained.

(Criterion 4.5. Pests, diseases, weeds and invasive introduced species are effectively managed using appropriate Integrated Pest Management techniques)

(Criterion 4.6. Pesticides are used in ways that do not endanger health or the environment)

4.6.1 (M) Justification of all pesticides used shall be demonstrated. The use of selective products that are specific to the target pest, weed or disease and which have minimal effect on non-target species shall be used where available.

4.6.2 (M) Records of pesticides use (including active ingredients used and their LD50, area treated, amount of active ingredients applied per ha and number of applications) shall be provided.

4.6.3 (M) Any use of pesticides shall be minimised as part of a plan, and in accordance with Integrated Pest Management (IPM) plans. There shall be no prophylactic use of pesticides, except in specific situations identified in national Best Practice guidelines.

4.6.4 Pesticides that are categorised as World Health Organisation Class 1A or 1B, or that are listed by the Stockholm or Rotterdam Conventions, and paraquat, are not used, except in specific situations identified in national Best Practice guidelines. The use of such pesticides shall be minimised and eliminated as part of a plan, and shall only be used in exceptional circumstances.

4.6.5 (M) Pesticides shall only be handled, used or applied by persons who have completed the necessary training and shall always be applied in accordance with the product label. Appropriate safety and application equipment shall be provided and used. All precautions attached to the products shall be properly observed, applied, and understood by workers (see Criterion 4.7).

4.6.6 (M) Storage of all pesticides shall be according to recognised best practices. All pesticide containers shall be properly disposed of and not used for other purposes (see Criterion 5.3).

4.6.7 Application of pesticides shall be by proven methods that minimise risk and impacts.

4.6.8 (M) Pesticides shall be applied aurally only where there is documented justification. Communities shall be informed of impending aerial pesticide applications with all relevant information within reasonable time prior to application.

4.6.9 Maintenance of employee and associated smallholder knowledge and skills on pesticide handling shall be demonstrated, including provision of appropriate information materials (see Criterion 4.8).

4.6.10 Proper disposal of waste material, according to procedures that are fully understood by workers and managers shall be demonstrated (see Criterion 5.3).

4.6.11 (M) Specific annual medical surveillance for pesticide operators, and documented action to treat related health conditions, shall be demonstrated.

4.6.12 (M) No work with pesticides shall be undertaken by pregnant or breast-feeding women.

RTRS (✓)

(Criterion 5.4 Negative environmental and health impacts of phytosanitary products are reduced by implementation of systematic, recognized Integrated Crop Management (ICM) techniques)

5.4.1. A plan for ICM is documented and implemented which addresses the use of prevention, and biological and other non-chemical or selective chemical controls.

5.4.2 There is an implemented plan that contains targets for reduction of potentially harmful phytosanitary products over time.

5.4.3 Use of phytosanitary products follows legal requirements and professional recommendations (or, if professional recommendations are not available, manufacturer's recommendations) and includes rotation of active ingredients to prevent resistance.

5.4.4 Records of monitoring of pests, diseases, weeds and natural predators are maintained.

(Criterion 5.5 All application of agrochemicals is documented and all handling, storage, collection and disposal of chemical waste and empty containers, is monitored to ensure compliance with good practice)

5.5.1 There are records of the use of agrochemicals, including:

- a) products purchased and applied, quantity and dates;
- b) identification of the area where the application was made;
- c) names of the persons that carried out the preparation of the products and field application;

d) identification of the application equipment used;

e) weather conditions during application.

5.5.2 Containers are properly stored, washed and disposed of; waste and residual agrochemicals are disposed in an environmentally appropriate way.

5.5.3 Transportation and storage of agrochemicals is safe and all applicable health, environmental and safety precautions are implemented.

5.5.4 The necessary precautions are taken to avoid people entering into recently sprayed areas.

5.5.5 Fertilisers are used in accordance with professional recommendations (provided by manufacturers where other professional recommendations are not available).

(Criterion 5.6 Agrochemicals listed in the Stockholm and Rotterdam Conventions are not used)

5.6.1 There is no use of agrochemicals listed in the Stockholm and Rotterdam Conventions.

5.6.2 The use of Paraquat and Carbofuran is eliminated by June 2017.

5.6.3 During this phasing out period the use of Carbofuran and Paraquat should be controlled, if possible reduced according an Integrated Crop Management (ICM) plan developed by the producer, which explains under what specific circumstances the use of Paraquat and Carbofuran is allowed.

Note for 5.6.2: In the Case of Paraquat, the deadline for the prohibition for its use by June 2017 could be extended by the RTRS if enough evidence is put forward before June 2016 to demonstrate that at the time there are still no alternatives in the market (globally or locally), that can substitute it with less environmental and human risks and with similar costs.

(Criterion 5.7 The use of biological control agents is documented, monitored and controlled in accordance with national laws and internationally accepted scientific protocols)

5.7.1 There is information about requirements for use of biological control agents.

5.7.2 Records are kept of all use of biological control agents that demonstrate compliance with national laws.

Bonsucro (✓)

4.1.4. Ratio of fertiliser N and P applied (expressed in eq. phosphate) to fertiliser N and P recommended by soil or leaf analysis (expressed in eq. phosphate)

4.1.5. Agrochemicals applied per hectare per year

4.1.6. Banned agro-chemicals applied per hectare per year.

CAP (✓)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Public health, animal health and plant health. Plant protection products.

CI 18. Avoid harvesting of threatened or endangered plant species

SAFA (✓)

E.4.2.1. Species Conservation Target: Species Conservation Target refers to the existence of a written plan with exact objectives, targets, action points and time-lines for the conservation, protection and rehabilitation of rare, endemic and other species of particular interest.

E.4.2.2. Species Conservation Practices: This indicator intends to capture all activities and practices that the operation has implemented which effectively protect and rehabilitate populations of wild plants and animals on or adjacent to the analysed enterprise's operations during the analysed time-frame.

E 4.2.3. Diversity and Abundance of Key Species: This indicator serves to determine how diversity and abundance of threatened and vulnerable wild species on the one hand, and invasive species on the other, have developed in, and adjacent to, the enterprise's operations during the analysed time-frame

SAN (✓)

2.4. The harvesting or other taking of threatened or endangered plant species is not permitted. Cutting, extracting or harvesting trees, plants and other non-timber forest products is only allowed in instances when the farm implements a sustainable management plan that has been approved by the relevant authorities, and has all the permits required by law. If no applicable laws exist, the plan must have been developed by a competent professional.

RSPO (✓)

(Criterion 5.2. The status of rare, threatened or endangered species and other High Conservation Value habitats, if any, that exist in the plantation or that could

be affected by plantation or mill management, shall be identified and operations managed to best ensure that they are maintained and/or enhanced.

5.2.2 (M) Where rare, threatened or endangered (RTE) species, or HCVs, are present or are affected by plantation or mill operations, appropriate measures that are expected to maintain and/or enhance them shall be implemented through a management plan.

RTRS (✓)

(Criterion 4.5. On-farm biodiversity is maintained and safeguarded through the preservation of native vegetation)

4.5.3 No hunting of rare, threatened or endangered species takes place on the property.

Bonsucro (✓)

6.1.2 Percentage of land with high biodiversity value, high carbon stock or peatlands planted to sugarcane after the cut-off date of 1 January 2008. Notes: (b) areas designated by law or by the relevant competent authority for nature protection purposes; or 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 by the European Commission; unless evidence is provided that the production of that raw material did not interfere with those nature protection purposes;

CI 19. Maintain or restore of areas of water influence

SAFA (✓)

E 2.2.2. Water Pollution Prevention Practices

SAN (✓)

9.1 The farm must execute a soil erosion prevention and control program that minimizes the risk of erosion and reduces existing erosion.(...) The farm must use and expand vegetative ground covers on the banks and bottoms of drainage canals to reduce erosion and agrochemical drift and runoff towards water bodies.

RSPO (✓)

4.4.2 (M) Protection of water courses and wetlands, including maintaining and restoring appropriate riparian and other buffer zones (refer to national best practice and national guidelines) shall be demonstrated

RTRS (✓)

(Criterion 5.2. Natural vegetation areas around springs and along natural watercourses are maintained or re-established)

5.2.1 The location of all watercourses has been identified and mapped, including the status of the riparian vegetation.

5.2.2 Where natural vegetation in riparian areas has been removed there is a plan with a timetable for restoration which is being implemented.

5.2.3 Natural wetlands are not drained and native vegetation is maintained.

CAP (✓)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Environment, climate change, good agricultural condition of land. Establishment of buffer strips along water courses.

CI 20. Monitor periodically key biotic and abiotic factors that might affect health and vitality of ecosystems

RSPO RED (~)

(Criterion 4.5. Pests, diseases, weeds and invasive introduced species are effectively managed using appropriate Integrated Pest Management techniques)

RTRS EU RED (✓)

(Criterion 5.11. Origin of seeds is controlled to improve production and prevent introduction of new diseases)

5.11.1 All purchased seed must come from known legal quality sources.

5.11.2 Self-propagated seeds may be used, provided appropriate seed production norms are followed and legal requirements regarding intellectual property rights are met.

CI 21. Avoid planting in certain areas to protect soils

SAFA (~)

E 3.2.2. Land Conservation and Rehabilitation Practices. (...) soil and water conservation measures to reduce the risk of soil and water erosion, including terracing on slopes, contour farming, planting of protection strips, diversion ditches or cutoff drains, retention ditches or infiltration ditches, bunds and pits;

RSPO (✓)

7.4. Extensive planting on steep terrain, and/or marginal and fragile soils, including peat, is avoided.

CI 22. Soil surface mechanically tilled per year (% of cultivated area)

Bonsucro (✓)

5.2.4. Soil surface mechanically tilled per year (% of cultivated area).

CI 23. Measures for soil conservation

SAFA (✓)

E 3.1.1. Soil Improvement Practices. This indicator refers to all practices that aim at improving the physical, chemical and biological properties of the soils used by an enterprise

E 3.1.2. Soil Physical Structure

E 3.1.3 Soil Chemical Quality

E 3.1.4. Soil Biological Quality

E 3.1.5 Soil Organic Matter

SAN (✓)

9.1 The farm must execute a soil erosion prevention and control program that minimizes the risk of erosion and reduces existing erosion. (...)

9.2 The farm must have a soil or crop fertilization program based on soil characteristics and properties, periodic soil or foliage sampling and analysis, and advice from a competent and impartial professional or authority.(...)

9.3 The farm must use and expand its use of vegetative ground cover to reduce erosion and improve soil fertility; structure and organic material content, as well as minimize the use of herbicides. There must be a vegetative ground cover establishment and expansion plan that indicates the areas with existing cover, as well as areas where cover will be established in the future. The farm must include a timeframe for these activities.

9.4 The farm must promote the use of fallow areas with natural or planted vegetation in order to recover natural fertility and interrupt pest life cycles. (...)

9.5 Critical Criterion. New production areas must only be located on land with the climatic, soil and topographic conditions suitable for intensity level of the agricultural production planned. The establishment of new production areas must be based on land use capacity studies that demonstrate long-term production capacity. The cutting of natural forest cover or burning to prepare new production areas is not permitted.

RSPO RED (✓)

(Criterion 4.2. Practices maintain soil fertility at, or where possible improve soil fertility to, a level that ensures optimal and sustained yield)

RTRS EU RED (✓)

5.4.1 A plan for ICM is documented and implemented which addresses the use of prevention, and biological and other non-chemical or selective chemical controls.

Annex 5: Integrated Crop Management (ICM) Measures and Practices in Soy Production

2. Technical measures for cultivation

2e. mechanical weed removal / intercultural operations which are not detrimental to soil structure, organic matter content or other soil and water values

(Criterion 5.3 Soil quality is maintained or improved and erosion is avoided by good management practices)

Note: For group certification - 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.

BONSUCRO (✓)

(5.2 To continuously improve the status of soil and water resources)

5.2.3 % Ground cover of tops or leaves after harvest

5.2.4 Soil surface mechanically tilled per year (% of cultivated area)

5.2.5 Percentage fields with samples showing analyses within acceptable limits for pH

CAP (~)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Environment, climate change, good agricultural condition of land: Soil and carbon stock.

CI 24. Percentage fields with samples showing analyses within acceptable limits for pH.

SAFA (✓)

E 3.1.3. Soil Chemical Quality. The chemical quality of soils determines their capacity to deliver various functions that are essential for vegetation growth, nutrient cycling and other ecosystem functions. It is a complex phenomenon that can be approached through a multitude of parameters, including pH value, electrical conductivity, cation exchange capacity, base saturation and the contents (total, dissolved, plant-available, etc.) of various chemical elements and molecules. (...)

Through visual inspection of plant growth in combination with soil sampling and analysis, delineate those areas where soil pH is too high (pH >8.5) or too low (pH <4.5), salinity is too high, chemical pollution (with heavy metals such as Cd, Cu, Ni, or organic compounds such as PCBs) or imbalances of nutrient supply (excess or deficiency) limit plant growth (...)

Bonsucro (✓)

5.2.5. Percentage fields with samples showing analyses within acceptable limits for pH.

CI 25. Avoid natural water contamination

SAFA (✓)

E 2.2.2. Water Pollution Prevention Practices.

SAN (✓)

4.7. Critical Criterion. The farm must not deposit into natural water bodies any organic or inorganic solids, such as domestic or industrial waste, rejected products, construction debris or rubble, soil and stones from excavations, rubbish from cleaning land, or other materials.

RSPO (✓)

4.4.1 An implemented water management plan shall be in place.

Guidance:(...)

- Avoid contamination of surface and ground water through run-off of soil, nutrients or chemicals, or as a result of inadequate disposal of waste including Palm Oil Mill Effluent (POME).

RTRS (✓)

5.1.1 Good agricultural practices are implemented to minimize diffuse and localized impacts on surface and ground water quality from chemical residues, fertilisers, erosion or other sources and to promote aquifer recharge.

Bonsucro (✓)

4.1.5 Agrochemicals applied per hectare per year. Notes: To minimise air, soil and water contamination.

CI 26. Promote gender equality**SAFA (✓)**

S 4.2.1. Gender Equality. This indicator intends to ensure that barriers to the employment of women on an equal basis with men are removed, that women receive equal pay for the same or similar work, and have equal opportunities for training and advancement. (...)

SAN (~)

5.2 Critical Criterion. The farm must not discriminate in its labour and hiring policies and procedures along the lines of race, colour, gender, age, religion, social class, political tendencies, nationality, union membership, sexual orientation, civil status or any other motive as indicated by applicable laws, ILO Conventions 100 and 111, and this standard. The farm must offer equal pay, training and promotion opportunities and benefits to all workers for the same type of work. The farm must not influence the political, religious, social or cultural convictions of workers.

RSPO (~)

6.4.2 A procedure for calculating and distributing fair compensation (monetary or otherwise) shall be established and implemented, monitored and evaluated in a participatory way, and corrective actions taken as a result of this evaluation. This procedure shall take into account: gender differences in the power to claim rights, ownership and access to land; differences of transmigrants and long-established communities; and differences in ethnic groups' proof of legal versus communal ownership of land.

CI 27. Availability of a mutually agreed and documented system for dealing with complaints and grievances, which is implemented and accepted by all affected parties**SAFA (✓)**

G 3.2.1. Grievance Procedures: Asymmetries of power can be reduced with the provision of clear, accessible and fair grievance procedures. The procedures need not be identical for all stakeholder groups but should follow the principles of natural justice and be designed to be culturally appropriate and where possible, mirror processes which are familiar to, and respected by, the stakeholder group.

G 3.3.1. Conflict Resolution: To achieve compliance with this indicator, organizations will need to show that conflicts of stakeholder interests with the enterprise's activities are resolved through collaborative dialogue (which could be arbitrated, mediated, facilitated, conciliated or negotiated), based on respect, mutual understanding and equity. Addressing conflicts within and between sectors requires engagement with different stakeholders.

SAN (✓)

1.7. The farm must have the necessary processes for follow up, measurement and analysis, including that of claims by workers or other persons or groups, to evaluate the functioning of the social and environmental management system and farm compliance with applicable laws and the standard. The results of these processes must be recorded and incorporated into the social and environmental management system through a continual improvement plan and program. The continual improvement program must include the necessary corrective actions to rectify non-compliance situations, as well as the mechanisms needed to determine if the actions are implemented and if they result in improvements or need to be adjusted to produce the desired results.

RSPO (✓)

(Criterion 6.3. There is a mutually agreed and documented system for dealing with complaints and grievances, which is implemented and accepted by all affected by all parties)

6.3.1 (M) The system, open to all affected parties, shall resolve disputes in an effective, timely and appropriate manner, ensuring anonymity of complainants and whistleblowers, where requested.

6.3.2 (M) Documentation of both the process by which a dispute was resolved and the outcome shall be available.

RTRS (✓)

(Criterion 3.3 A mechanism for resolving complaints and grievances is implemented and available to local communities and traditional land users)

Note: For group certification - the complaints and grievances mechanism can be managed by the group manager and records of complaints and grievances can be maintained at the group level.

3.3.1 The complaints and grievances mechanism has been made known and is accessible to the communities.

3.3.2 Documented evidence of complaints and grievances received is maintained.

3.3.3 Any complaints and grievances received are dealt with in a timely manner.

Bonsucro (✓)

5.8.1. Existence of usage of a recognised and accessible grievance and dispute resolution mechanism for all stakeholders.

CI 28. Contribution to local sustainable development (including use of local processing, supply of goods and services to the local population, benefit sharing and engagement of involved people)

SAFA (✓)

C.1.2.1. Community Investment: This indicator measures the extent to which the enterprise' investments have contributed to meet community needs

C.4.2.1. Local Procurement: This indicator measures whether the enterprise has purchased its inputs/ingredients/products from local suppliers when equal or similar conditions exist, in comparison to non-local suppliers.

SAN (✓)

7.3. The farm must have policies and procedures for prioritizing the hiring and training of a local labour force and for contracting and acquiring local services and products.

7.4 The farm must contribute to the protection and conservation of community natural resources, collaborate with the development of the local economy, and contribute fairly towards the costs of the community infrastructure and local shared resources consumed – schools, pathways, aqueducts and other infrastructure as well as water and other resources – according to the amount used by the farm. Farms must negotiate a fair compensation with local communities and local and national authorities for resources and infrastructure used.

7.5 The farm must help with local environmental education efforts and must support and collaborate with local research in areas related to this standard.

RSPO (✓)

(Criterion 6.11. Growers and millers contribute to local sustainable development where appropriate)

Indicators:

6.11.1 Contributions to local development that are based on the results of consultation with local communities shall be demonstrated.

6.11.2 Where there are scheme smallholders, there shall be evidence that efforts and/or resources have been allocated to improve smallholder productivity.

RTRS (✓)

3.4.3 Opportunities for supply of goods and services are offered to the local population.

CI 29. Benefit sharing

SAFA (✓)

S 1.1.2: Wage Level. (...)Limitations: Living wage does not take into consideration the full extent of issues present in the employer-employee relationships involving wage rate, including such issues as fair negotiation, equal pay for equal work between diverse groups of employees, and the presence or absence of a fair pay scale that allows for raises, equal access to bonuses or profit sharing, and other benefits and schemes. In addition, economic conditions may temporarily prevent an operation from paying a living wage. In these instances, despite a low score on this indicator, operations may still progress toward social sustainability by adopting profit-sharing plans, working with employees to reduce operating costs to reach living wage goals, and other creative measures.

RSPO (✓)

2.3.3 All relevant information shall be available in appropriate forms and languages, including assessments of impacts, proposed benefit sharing, and legal arrangements.

CI 30. Support to Vulnerable People

SAFA (✓)

S 4.3.1. Support to Vulnerable People: This qualitative indicator looks into policies and practices that have effectively accommodated varying levels of ability and disability, young workers and aged ones. It also measures whether the enterprise has provided resources to the local community to support vulnerable people with social and health services, training including languages, and cultural events

RSPO (-)

4.8.1(M) A formal training programme shall be in place that covers all aspects of the RSPO Principles and Criteria, and that includes regular assessments of training needs and documentation of the programme. Guidance: Workers should be adequately trained on: the health and environmental risks of pesticide exposure;

recognition of acute and long-term exposure symptoms including the most vulnerable groups (e.g. young workers, pregnant women); ways to minimise exposure to workers and their families; and international and national instruments or regulations that protect workers' health.

CI 31. Rights of indigenous peoples & local communities -defined in the United Nations Declaration on the Rights of Indigenous Peoples (2007) and ILO Convention 169 (1989).

SAFA (✓)

S 6.1.1. Indigenous Knowledge.

This qualitative indicator measures whether enterprises: recognize and respect the universal rights of indigenous communities to protect their knowledge; and if appropriated and acquired, whether enterprises remunerate indigenous communities in a fair and equitable manner, based on mutually agreed terms.

CI 32. Existence of conflict management mechanisms

SAFA (✓)

C 2.5.1. Risk Management. A risk adaptation and mitigation plan is a structured set of actions and mechanisms to implement to prevent, manage and reduce the extent to which the enterprise is exposed to internal and external risks(s), its(their) likelihood of occurrence, and to minimize its(their) possible negative impact. Some risks the enterprise could be exposed to include price, production, market and credit risk, unstable employment relations, unavailability of workforce, conflicts with the community and other stakeholders, natural disasters, diseases and climate change.

RSPO RED (✓)

2.2.4 (M) There shall be an absence of significant land conflict, unless requirements for acceptable conflict resolution processes (see Criteria 6.3 and 6.4) are implemented and accepted by the parties involved.

RTRS EU RED (✓)

(Criterion 3.2 In areas with traditional land users, conflicting land uses are avoided or resolved)

3.2.1 In the case of disputed use rights, a comprehensive, participatory and documented community rights assessment is carried out.

(Criterion 3.3 A mechanism for resolving complaints and grievances is implemented and available to local communities and traditional land users)

Bonsucro EU (✓)

5.8.1 Existence of usage of a recognised and accessible grievance and dispute resolution mechanism for all stakeholders.

CI 33. Indigenous Knowledge

SAFA (✓)

S 6.1.1. Indigenous Knowledge.

CI 34. Negotiations concerning compensation for loss of legal, customary or user rights are dealt with through a documented system that enables indigenous peoples, local communities and other stakeholders to express their views through their own representative institutions as free, prior and informed consent and negotiated agreements

SAFA (✓)

G 3.1.4 Effective participation. Stakeholder engagement is of greatest value when an organization can incorporate the views of its stakeholders in its decision-making. Demonstrating how stakeholder engagement has influenced the enterprise's decisions is the test which is applied. The process of this enquiry is likely to lead to enhanced stakeholder engagement and a greater value being placed on stakeholder views. Giving stakeholders feedback about how their engagement was used and what it has changed is important to maintain trust and build the relationships that encourage proactive dialogue from stakeholders. Failure to ensure effective feedback can contribute to consultation fatigue.

G.4.4.1. Free, Prior and Informed Consent: (...) The principles of Free, Prior and Informed Consent (FPIC) have been developed through extensive consultation to protect communities from unscrupulous resource exploitation and misappropriation. They also provide guidance for enterprises on how to work fairly with communities and some degree of protection to the organization's reputation. Critical to the effective operation of PFIC is the ability for the affected community to be informed (...).

RSPO (✓)

6.4. Any negotiations concerning compensation for loss of legal, customary or user rights are dealt with through a documented system that enables indigenous peoples, local

communities and other stakeholders to express their views through their own representative institutions.

7.6. Where it can be demonstrated that local peoples have legal, customary or user rights, they are compensated for any agreed land acquisitions and relinquishment of rights, subject to their free, prior and informed consent and negotiated agreements.

RTRS (✓)

3.2.1 In the case of disputed use rights, a comprehensive, participatory and documented community rights assessment is carried out.

3.2.2 Where rights have been relinquished by traditional land users there is documented evidence that the affected communities are compensated subject to their free, prior, informed and documented consent.

4.4.2. There is no conversion of land where there is an unresolved land use claim by traditional land users under litigation, without the agreement of both parties.

CI 35. Fair Pricing and Transparent Contracts

SAFA (✓)

S 2.1.1. Fair Pricing and Transparent Contracts

RSPO (✓)

(Criterion 6.10. Growers and millers deal fairly and transparently with smallholders and other local businesses)

6.10.3 Evidence shall be available that all parties understand the contractual agreements they enter into, and that contracts are fair, legal and transparent.

RTRS (✓)

2.2.1 Workers (including temporary workers), sharecroppers, contractors and subcontractors have a written contract, in a language that they can understand.

2.2.2 Labour laws, union agreements or direct contracts of employment detailing payments and conditions of employment (e.g. working hours, deductions, overtime, sickness, holiday entitlement, maternity leave, reasons for dismissal, period of notice, etc.) are available in the languages understood by the workers or explained carefully to them by a manager or supervisor

Bonsucro (✓)

2.3.4 Payment for cane deliveries are made according to agreed contract. Notes: Payment shall be made according to contractual agreement (including value and timing of payment).

(2.4 To provide clear, equitable and comprehensive contracts)

2.4.1 Existence of a contract or equivalent document.

CI 36. All staff, workers, smallholders and contract workers are appropriately trained**SAFA (✓)**

S 1.2.1. Capacity Development. (...) Primary producers have the right to adequate resources so that they can increase their own skills and knowledge, and assure the future of their enterprise by providing opportunities for learning and training for members of their family, community or tribe.

SAN (✓)

1.9. The farm must implement a training and education program in order to guarantee the effective execution of the social and environmental management system and its programs. The training topics must be identified according to the standard, the position, and type of work carried out. Records must be kept that include the participants' signatures, topics covered and the instructor's name for each training or educational event. The required training must be paid as part of the normal workday.

6.2. The farm must have a permanent and continuous training program to educate workers on how to carry out their work correctly and safely, especially regarding the handling of machinery and agricultural equipment. Workers must be familiar with the training requirements for their job, and must be trained before starting work on the farm. On farms with ten or more permanent production and processing workers, the farm must keep a written record of each training session, including its objectives, subjects covered, workers required to attend, materials used, frequency and duration, and a list of those who participated.

RSPO (✓)

(Criterion 4.8. All staff, workers, smallholders and contract workers are appropriately trained)

4.8.1 (M) A formal training programme shall be in place that covers all aspects of the RSPO Principles and Criteria, and that includes regular assessments of training needs and documentation of the programme.

4.8.2 Records of training for each employee shall be maintained.

RTRS (✓)

2.2.3. Adequate and appropriate training and comprehensible instructions on fundamental rights at work, health and safety and any necessary guidance or supervision are provided to all workers.

3.4.2. There is collaboration with training programs for the local population.

Bonsucro (✓)

2.2.4. Percentage of staff trained for health and safety at start and at least every 5 years

5.1.1. Percentage of payroll dedicated for or time spent by direct employees in vocational training sessions.

CI 37. Research and extension costs as a % of sales

SAN (~)

7.5 The farm must help with local environmental education efforts and must support and collaborate with local research in areas related to this standard.

Bonsucro (✓)

5.6.1. Research and extension costs as a % of sales.

CI 38. Research and extension costs as a % of sales

SAN (~)

7.5 The farm must help with local environmental education efforts and must support and collaborate with local research in areas related to this standard.

Bonsucro (✓)

5.6.1. Research and extension costs as a % of sales.

3.3. Bioenergy schemes

In Table 9 the benchmark and gap analysis of the selected Bioenergy schemes against the identified Complementary indicators is shown. This Table shows the complementary indicators that were meaningfully reflected in the analysed schemes.

Table 9 *Benchmark and Gap Analysis of the selected Bioenergy Schemes against the identified Complementary Indicators (meaningfully reflected in the analysed schemes)*

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	GBEP	RED	RSB (Global)	SBP	RSPO	RTRS	Bonsucro	Greenery	ISCC-EU	GGL-Agri	GGL-Forest	
Theme 1: Environment	1	Waste	1	Waste management and reduction, recycle and re-use of waste			✓	✓	✓	✓	✓	✓	✓	✓		
			2	Waste generation per ton of product					~	~	✓		~			
	2	Best environmental practices	3	“Responsible” management of wastewater	✓										✓	
			4	No use of burning		~	✓		✓	✓		✓	✓			
			5	Responsible management infrastructural development, transport activities and silviculture					✓	~						
	3	Land Use and Land Use Change	6	Assure the permanence of vegetation (regenerate vegetation cover)							~			~		
			7	Rehabilitate degraded ecosystems										~	✓	~
			8	Land Use Change	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	GBEP	RED	RSB (Global)	SBP	RSPO	RTRS	Bonsucro	Greenery	ISCC-EU	GGL-Agri	GGL-Forest
	4	Sustainable harvesting of forest products and non-wood forest products	9	Harvest products and services from the Management Unit at or below a level which can be permanently sustained	✓			✓	~	~					✓
C1: Resource efficiency	5	Resource use	10	Efficiency of systems of production and transformation	✓		✓		~		✓			✓	✓
			11	Intensity of fossil fuel use	✓				✓	✓					
C1: Resource efficiency	6	Best Practices for Resource Efficiency	12	Energy saving practices			☐		✓		✓	☐		☐	☐
C2: Climate change	7	Best Environmental Practices for Climate Change reduction	13	Practices to diminish GHG emissions	✓	✓	✓		✓	✓	✓	✓			
			14	Practices to increase carbon dioxide sequestration		~			✓	✓	~		~		
	8	Climate change	15	Maintenance of forest contribution to global carbon cycles											
C3: Biodiversity	9	Best Environmental Practices for	16	Practices to diminish spread of invasive introduced species and new pests or diseases	✓	~	✓		✓	✓		✓	✓	✓	

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	GBEP	RED	RSB (Global)	SBP	RSPO	RTRS	Bonsucro	Greenenergy	ISCC-EU	GGL-Agri	GGL-Forest
		Biodiversity conservation	17	"Responsible" application of agrochemicals (in the case of forestry minimize or eliminate) and biological control agents	~	~	✓	✓	✓	✓	✓	✓	✓	✓	
			18	Avoid harvesting of threatened or endangered plant species	~		✓	✓	✓	✓	✓	~	✓		✓
	10	Other indicators for biodiversity conservation	19	Maintain or restore of areas of water influence	✓		✓		✓	✓			✓		
			20	Monitor periodically key biotic and abiotic factors that might affect health and vitality of ecosystems				✓	~	✓			✓	✓	✓
C4:Soils	11	Best Environmental Practices	21	Avoid planting in certain areas to protect soils					✓			~	✓		
	12	Other considerations for soil conservation	22	Soil surface mechanically tilled per year (% of cultivated area)							✓		✓		
			23	Measures for soil conservation	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
			24	pH (Percentage fields with samples showing analyses within acceptable limits for pH)							✓		~		
C5: Water	13	Best environmental practices	25	Avoid natural water contamination	✓		✓	✓	✓	✓	✓	✓	~		
Theme 2: Social	14	Social wellbeing	26	Promote gender equality			✓		~		~	~			

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	GBEP	RED	RSB (Global)	SBP	RSPO	RTRS	Bonsucro	Greenery	ISCC-EU	GGL-Agri	GGL-Forest		
Theme2: Social	15	Social wellbeing	27	Availability of a mutually agreed and documented system for dealing with complaints and grievances, which is implemented and accepted by affected parties				✓	✓	✓	✓		✓				
			28	Use local processing, local services, and local value adding.			✓		✓	✓			~				
			29	Benefit sharing mechanism					✓					✓			
			30	Support to vulnerable people	~		✓		~				✓				
Theme 2: Social	16	Rights of indigenous peoples & local communities	31	Rights of indigenous peoples & local communities - defined in the United Nations Declaration on the Rights of Indigenous Peoples (2007) and ILO Convention 169 (1989).			✓	~					✓	□			
			32	Existence of conflict management mechanisms	✓		~	✓	✓	✓	✓		✓				
T2: Social	17	Traditional knowledge	33	Traditional knowledge													

S2Biom related Theme (T) or Criterion (C)	#	Topic	#	Complementary Indicators	GBEP	RED	RSB (Global)	SBP	RSPO	RTRS	Bonsucro	Greenenergy	ISCC-EU	GGL-Agri	GGL-Forest	
C7: Participation and transparency	18	Documented system for participatory processes	34	Negotiations concerning compensation for loss of legal, customary or user rights are dealt with through a documented system that enables indigenous peoples, local communities and other stakeholders to express their views through their own representative institutions as free, prior and informed consent and negotiated agreements			~	✓	✓	✓			✓			
9. Employment and labour conditions	19	Employment and labour conditions	35	Fair Pricing and Transparent Contracts					✓	✓	✓	✓	✓			
			36	Training and requalification of the workforce	✓		✓	✓	✓	✓	✓	✓	✓			
Theme 3: Economic	20	Economic	37	Value of products (includes value and volume of production and/or value added per ton)			✓		✓		✓				✓	
			38	Means for research								✓				
			39	Incentives for investments												

CI 1. Waste Management and reduction, recycle and re-use of waste

RSB (GLOBAL) (✓)

(Criterion 11e. Residues, wastes and by-products from feedstock processing and biofuel production units shall be managed such that soil, water and air physical, chemical, and biological conditions are not damaged)

SBP (✓)

2.2.9. The BP has control systems and procedures for verifying that methods of waste disposal minimise negative impacts on forest ecosystems (CPET S5d).

RSPO RED (✓)

(Criterion 5.3. Waste is reduced, recycled, re-used and disposed of in an environmentally and socially responsible manner)

RTRS EU RED (✓)

(Criterion 4.2 Pollution is minimized and production waste is managed responsibly)

4.2.1 There is no burning on any part of the property of crop residues, waste, or as part of vegetation clearance, except under one of the following conditions:

- a) Where there is a legal obligation to burn as a sanitary measure;
- b) Where it is used for generation of energy including charcoal production and for drying crops;
- c) Where only small-calibre residual vegetation from land clearing remains after all useable material has been removed for other uses.

4.2.2 There is adequate storage and disposal of fuel, batteries, tires, lubricants, sewage and other waste.

4.2.3 There are facilities to prevent spills of oil¹ and other pollutants.

4.2.4 Re-use and recycling are utilised wherever possible.

4.2.5 There is a residue management plan including all areas of the property.

5.5.2. Containers are properly stored, washed and disposed of; waste and residual agrochemicals are disposed in an environmentally appropriate way.

Bonsucro (✓)

5.5.3. Percentage of categories of non-production waste that are recycled

Greenergy (✓)

14.1.1 No evidence of noncompliance with relevant national and local laws and regulations including:

- Environmental Impact Assessment
- Waste storage and handling
- Pesticides and agro-chemicals
- Fertiliser
- Irrigation and water usage.

ISCC-EU (✓)

2.6.8 The use of raw sewage sludge is not allowed

(Criterion 2.10 Empty Plant Protection Product Containers and Waste Disposal)

2.10.4 The premises have adequate provisions for waste disposal

National and regional legislation is followed when storing and disposing wastes. The farm has designated areas to store litter and waste, which do not create a safety or health hazard. Risks of different types of wastes are identified, and the wastes are stored according to risk identification. This especially applies to hazardous wastes. If applicable, waste burning and disposal should always be done by official, authorized systems. If not available, on-farm disposal should follow best practices. The following rules are to be followed:

If waste is burned on-farm, certain requirements must be fulfilled:

- Burning hazardous wastes like solvents, certain plastics or plant protection products on-farm is not allowed;
- PVC and certain other plastics should not be burned in on-farm incinerators (especially in open fires or low-temperature incinerators);
- Incinerators and burning sites are in legal locations and fit for purpose.

If on-farm disposal takes place, certain requirements shall be fulfilled:

- Sanitary landfills on the farm are designed according to the requirements of national legislation or where not available – governed by best practice guidelines defined by

farm management;

- Litter and other general waste is not thrown into ditches, stream ways or holes that might flood;

Disposals of burned wastes are covered with a suitable layer of soil.

2.10.5 There is a farm waste management plan. Waste reduction, reuse and recycling avoids or reduces wastage and avoids the use of landfill or burning

Best practices must be addressed in the waste management plan. They refer to:

- Prevention of wastes;
- Prevention of on-farm burning of certain waste materials;
- Prevention of contamination of on-site landfill disposal;
- Prevention of contamination with respect to disposal of ash;

The waste management plan should include the phases (1) risk assessment, (2) target setting, (3) risk management and (4) monitoring. It should be documented if on-farm burning and landfill disposal took place. An assessment of risks to humans and environment should be conducted in case burning and disposal took place on-farm. Appropriate management measures could be inter alia minimization of waste materials, or energy recovery, or efficient burning sites/incinerators. Record keeping must be in place for produced waste amounts and on-farm disposal (including discharge to landfill, drains, sewers, surface water, land or groundwater). If burning takes place, further records on types of wastes burned and the type of burning practice (e.g. open fire, low temperature incinerators) should be available. Records of the risk assessment as well as appropriate monitoring and management measures must be kept for at least five years. A comprehensive, current, documented plan that covers wastage reduction, pollution and waste recycling is available. Air, soil, water, noise and light contamination must be considered.

GGL-Agri (✓)

- 4.3 Proper dispose of sewage and waste from the farm and human settlements and of manure produces by intensive life stock breeding.

CI 2. Waste production per ton of product

RSPO RED (~)

4.2.4 A nutrient recycling strategy shall be in place, and may include use of Empty Fruit Bunches (EFB), Palm Oil Mill Effluent (POME), and palm residues after replanting.

RTRS EU RED (~)

(4.2 Pollution is minimized and production waste is managed responsibly)

4.2.1 There is no burning on any part of the property of crop residues, waste, or as part of vegetation clearance, except under one of the following conditions:

- a) Where there is a legal obligation to burn as a sanitary measure;
- b) Where it is set for generation of energy including charcoal production and for drying crops;
- c) Where only small-calibre residual vegetation from land clearing remains after all useable material has been removed for other uses.

4.2.2 There is adequate storage and disposal of fuel, batteries, tires, lubricants, sewage and other waste.

4.2.3 There are facilities to prevent spills of oil and other pollutants.

4.2.4 Re-use and recycling are utilised wherever possible.

4.2.5 There is a residue management plan including all areas of the property.

Bonsucro (✓)

5.5.2. Nonhazardous solid residues of production per ton cane

ISCC (~)

2.10.5 There is a farm waste management plan. Waste reduction, reuse and recycling avoids or reduces wastage and avoids the use of landfill or burning.

CI 3. “Responsible” management of wastewater

GBEP (✓)

6. Water quality.

(6.2) Pollutant loadings to waterways and bodies of water attributable to bioenergy processing effluents, and expressed as a percentage of pollutant loadings from total agricultural processing effluents in the watershed

ISCC (✓)

2.5.3 Application of good agricultural practices to reduce water usage and to maintain and improve water quality

(...) Appropriate management measures to improve water quality could include inter alia setting up buffer zones around water bodies, an efficient handling of fertilisers including sewage sludge, wastewater treatment, installing efficient irrigation techniques (including rainwater harvesting, drain design) as well as timing the irrigation appropriately to crop requirements.

(...)

GGL-Agri (✓)

4.8 Waste water re-use has to be part of the agriculture management system.

CI 4. No use of burning**RED (~)**

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Soil and Carbon Stock. Maintenance of soil organic matter level through appropriate practices including ban on burning arable stubble, except for plant health reasons.

RSB (GLOBAL) (✓)

(Criterion 10b. Biofuel operations shall avoid and, where possible, eliminate open-air burning of residues, wastes or by-products, or open air burning to clear the land)

RSPO RED (✓)

(Criterion 5.5. Use of fire for preparing land or replanting is avoided, except in specific situations as identified in the ASEAN guidelines or other regional best practice)

(Criterion 7.7. No use of fire in the preparation of new plantings other than in specific situations, as identified in the ASEAN guidelines or other regional best practice)

RTRS EU RED (✓)

4.2.1 There is no burning on any part of the property of crop residues, waste, or as part of vegetation clearance, except under one of the following conditions:

- a) Where there is a legal obligation to burn as a sanitary measure;
- b) Where it is used for generation of energy including charcoal production and for drying crops;
- c) Where only small-calibre residual vegetation from land clearing remains after all useable material has been removed for other uses.

Greenergy (✓)

I5.1.1 No evidence of noncompliance with national and local laws and regulations with respect to:

- Environmental Impact Assessment
- Air emissions
- Waste management
- Burning practices

I5.2.1 Evidence that no burning occurs as part of land clearing or waste disposal.

ISCC-EU (✓)

2.4.3 Restriction on burning

The burning of stubble or other crop residues is only allowed with the permission of competent authority and if there are no viable alternatives . Burning as part of land clearance is prohibited. When burning of stubble or other crop residues takes place, it is done in a responsible way (e.g. by considering influencing factors like wind direction).

CI 5. Responsible management infrastructural development, transport activities and silviculture

RSPO RED (✓)

5.1.1 (M) An environmental impact assessment (EIA) shall be documented.

Guidance:

The EIA should cover the following activities, where they are undertaken:

- Building new roads, processing mills or other infrastructure;

(...)

RTRS EU RED (~)

4.1.1 A social and environmental assessment is carried out prior to the establishment of large or high risk new infrastructure.

GGL-Forest (✓)

Principle 2 Management plan

2.2c Information gathered through resource inventories and a description of silvicultural and/or other management system based on the ecology of the forest.

CI 6. Assure the permanence of vegetation (regenerate vegetation cover)

RTRS EU RED (~)

4.3.4 Opportunities for increasing carbon sequestration through restoration of native vegetation, forest plantations and other means are identified.

ISCC-EU (~)

2.2.1 Natural vegetation areas around springs and natural watercourses are maintained or re-established.

The producer knows the status of riparian vegetation. Setting up, maintaining or restoring appropriate riparian buffer zones protects watercourses and wetlands. Where natural vegetation in riparian areas has been removed there is a plan with a timetable for recovery.

CI 7. Rehabilitate degraded ecosystems

ISCC (~)

2.1.2 Where production of raw material does not interfere with protection purposes (set in Principle 1), appropriate management measures shall be implemented to avoid damage or deterioration of habitats.

(...) Around all protected areas (covered in Principle 1), set aside land or wildlife corridors, appropriate buffer zones shall be protected, restored or set up.

2.2.1 Natural vegetation areas around springs and natural watercourses are maintained or re-established.

The producer knows the status of riparian vegetation. Setting up, maintaining or restoring appropriate riparian buffer zones protects watercourses and wetlands. Where natural vegetation in riparian areas has been removed there is a plan with a timetable for recovery.

GGL-Agri (✓)

Principle 3 The agriculture management is aimed at land conservation and rehabilitation.

Criteria: 3.1 Land degradation is surveyed on a regular basis.

3.2 Land and conservation areas at risk are identified and the policy and management measures are formulated.

GGL-Forest (~)

5.1 Plantations shall be planned and managed in accordance with the principles 1-4, and principle 5. They should complement the management of, reduce pressures on and promote the restoration and conservation of natural forests.

CI 8. Land Use Change

GBEP (✓)

8. Land use and land-use change related to bioenergy feedstock production. (8.1) Total area of land for bioenergy feedstock production, and as compared to total national surface and (8.2) agricultural land and managed forest area (8.3) Percentages of bioenergy from: (8.3a) yield increases, (8.3b) residues, (8.3c) wastes, (8.3d) degraded or contaminated land (8.4) Net annual rates of conversion between land-use types caused directly by bioenergy feedstock production, including the following (amongst others): arable land and permanent crops, permanent meadows and pastures, and managed forests natural forests and grasslands (including savannah, excluding natural permanent meadows and pastures), peatlands, and wetlands

RED (✓)

DIRECTIVE 2009/28/EC. Article 17.

3. Biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall not be made from raw material obtained from land with high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have that status:

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

(b) areas designated:

(i) by law or by the relevant competent authority for nature protection purposes; 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 second subparagraph of Article 18(4);

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

(c) highly biodiverse grassland that is:

(i) natural, namely grassland that would remain grassland in the absence of human intervention and which 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 which is species-rich and not degraded, unless evidence is provided that the harvesting of the raw material is necessary to preserve its grassland status.

The Commission shall establish the criteria and geographic ranges to determine which grassland shall be covered by point (c) of the first subparagraph. Those measures, designed to amend non-essential elements of this Directive, by supplementing it shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 25(4).

4. Biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall not be made from raw material obtained from

land with high carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status:

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

(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, unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology laid down in part C of Annex V is applied, the conditions laid down in paragraph 2 of this Article would be fulfilled.

The provisions of this paragraph shall not apply if, at the time the raw material was obtained, the land had the same status as it had in January 2008.

5. Biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.

SBP (✓)

2.1.3. The BP has control systems and procedures for verifying that feedstock is not sourced from forests converted to production plantation forest or non-forest lands after January 2008

RSPO RED (✓)

7.3.2 (M) A comprehensive HCV assessment, including stakeholder consultation, shall be conducted prior to any conversion or new planting. This shall include a land use change analysis to determine changes to the vegetation since November 2005. This analysis shall be used, with proxies, to indicate changes to HCV status.

R1.1 There is evidence that the land was under palm oil production in January 2008.

R1.1 Indicators:

- Records indicating the land use in January 2008 shall be kept.
- The status of the land in January 2008 shall be communicated to the next economic operator.

RTRS EU RED (✓)

(Criterion 2.1 There is no conversion of high biodiversity areas)

2.1.1 There is evidence to confirm in January 2008, the land currently under soy cultivation did not have any of the following statuses:

- primary forest

(Criterion 4.4 Expansion of soy cultivation is responsible)

Note: This criterion will be revised after June 2012 if RTRS-approved maps and system are not available.

4.4.1. After May 2009 expansion for soy cultivation has not taken place on land cleared of native habitat except under the following conditions:

4.4.1.1 It is in line with an RTRS-approved map and system (see Annex 4.)

or

4.4.1.2 Where no RTRS-approved map and system is available:

a) Any area already cleared for agriculture or pasture before May 2009 and used for agriculture or pasture within the past 12 years can be used for soy expansion, unless regenerated vegetation has reached the definition of native forest (see glossary).

b) There is no expansion in native forests (see glossary)

c) In areas that are not native forest (see glossary), expansion into native habitat only occurs according to one of the following two options:

Option 1. Official land-use maps such as ecological-economic zoning are used and expansion only occurs in areas designated for expansion by the zoning. If there are no official land use maps then maps produced by the government under the Convention on Biological Diversity (CBD) are used, and expansion only occurs outside priority areas for conservation shown on these maps.

Option 2. An High Conservation Value Area (HCVA) assessment is undertaken prior to clearing and there is no conversion of High Conservation Value Areas.

Note: Where neither official land use maps nor CBD maps exist, Option 2 must be followed.

4.4.2 There is no conversion of land where there is an unresolved land use claim by traditional land users under litigation, without the agreement of both parties.

RED Requirements:

2.1 There is no conversion of high biodiversity areas

2.1.1 There is evidence to confirm in January 2008, the land currently under soy cultivation did not have any of the following statuses:

- primary forest
- grassland
- designation for nature protection purposes, unless evidence is provided that soy cultivation did not interfere with those nature protection purposes.
- designation for the protection of rare, threatened or endangered ecosystems or species recognised by the European Commission, unless evidence is provided that soy cultivation did not interfere with those nature protection purposes.

2.2 There is no conversion of high carbon areas

2.2.1 There is evidence that no conversion of high carbon stock areas has occurred since January 2008. Land with high carbon stock status is:

- Land that is covered with or saturated by water permanently or for a significant part of the year.
- Peatland
- Continuously forested areas
- Land spanning more than one hectare with trees higher than five meters and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds in situ, unless evidence is provided that the GHG emissions for the whole supply chain meet the 35% savings threshold.

2.2.2 For land defined as peatland according to its soil type, that was partially drained in January 2008, a subsequent deeper drainage, affecting soil that was not already fully drained, would constitute a breach of the criterion.

2.2.3 For land defined as wetland according to its hydrological status, no drainage occurred since January 2008 that led to losing this status.⁴

Bonsucro EU (✓)

6.1.2 Percentage of land with high biodiversity value, high carbon stock or peatlands planted to sugarcane after the cut-off date of 1 January 2008.

Greenergy (✓)

I.1.1.1 Evidence that biomass production has not caused direct land use change, on or after 1 January 2008, which results in GHG emissions not meeting the minimum threshold for greenhouse gas savings.

I.1.1.2 Evidence that biomass production has not caused direct land use change of wetlands on or after 1 January 2008.

I.1.1.3 Evidence that biomass production has not caused direct land use change of peatlands on or after 1 January 2008.

I.1.1.4 Evidence that biomass production has not caused direct land use change of continuously forested areas on or after 1 January 2008.

I.2.2.1 Evidence that biomass production has not caused direct land use change of primary forest and other wooded land on or after 1 January 2008.

ISCC-EU (✓)

(Criterion 1.1 Biomass is not produced on land with high biodiversity value)

(Criterion 1.2 Biomass is not produced on highly biodiverse grassland)

(Criterion 1.3 Biomass is not produced on land with high carbon stock)

(Criterion 1.4 Biomass is not produced on land that was peatland in January 2008 or thereafter (Article 17(5) of the Directive 2009/28/EC))

GGL-Agri (✓)

Principle 8 Raw materials shall not be obtained from land with high carbon stock.

Principle 9 Raw materials shall not be obtained from peatland.

GGL-Forest (✓)

5.2 For existing plantations the management has to demonstrate, that the plantation was not established by converting a forest.

Principle 8 Raw materials shall not be obtained from land with high carbon stock.

Principle 9 Raw materials shall not be obtained from peatland.

CI 9. Harvest products and services from the Management Unit at or below a level which can be permanently sustained

GBEP (✓)

3. Annual harvest of wood resources by volume and as a percentage of net growth or sustained yield, and the percentage of the annual harvest used for bioenergy

SBP (✓)

2.3.1. Calculations show that feedstock harvesting does not exceed the long-term production capacity of the forest, avoids significant negative impacts on forest productivity and ensures long-term economic viability. Harvest levels are justified by inventory and growth data.

GGL-Forest (✓)

4.2b Growth rates, regeneration and condition of the forest.

CI 10. Efficiency of systems of production and transformation

GBEP (✓)

17. Productivity

(17.1) Productivity of bioenergy feedstocks by feedstock or by farm/plantation

(17.2) Processing efficiencies by technology and feedstock

(17.3) Amount of bioenergy end product by mass, volume or energy content per hectare per year

(17.4) Production cost per unit of bioenergy

RSB (GLOBAL) (✓)

11.e.i.2. The participating operator provides objective evidence demonstrating that residues, wastes and by-products are not in direct contact with soils, water sources and air outside the processing and production units unless their innocuousness to the environment and people is officially stated by

manufacturers or the country or regional (e.g. EU, ASEAN, ALENA) guidelines.

11.e.2 Progress requirements

- Measures shall be taken to implement clean and efficient processes for conversion of residues, wastes or by-products into energy appropriate to the scale and intensity of operation.(...)

11.e.i.7. The participating operator provides objective evidence demonstrating that within three years of certification residues, wastes or by-products are recycled or processed (e.g. burning, fermentation, gasification, etc.) to produce gas, electricity or heat, or in some other way improve the overall system efficiency, with appropriate license and within an appropriate facility, or transferred to other sectors when their transfer may improve the overall system's energy balance, greenhouse gas emissions, and/or economic viability without impairing the other principles and criteria in this standard.

RSPO RED (~)

5.4. Efficiency of fossil fuel use and the use of renewable energy is optimised.

6.11.2 Where there are scheme smallholders, there shall be evidence that efforts and/or resources have been allocated to improve smallholder productivity.

Bonsucro EU (✓)

3.1.1. Total raw materials used per kg product

5.3.2. Fermentable total sugars content of cane, expressed as invert (TSAI)

(Criterion 5.4 To promote energy efficiency)

5.4.1 Total Net Primary Energy Usage per kg product

5.4.2 Energy used in cane transport per ton cane transported

5.4.3 Primary energy use per ton of sugarcane

GGL-Agri (✓)

4.1 Efficiency and productivity of agricultural water use for better utilization of limited water resources has to increase.

GGL-Forest (✓)

4.2e Costs, productivity and efficiency of forest management.

CI 11. Intensity of fossil fuel use

GBEP (✓)

20. This indicator is primarily related to the theme of Economic development and is also closely related to Energy security/diversification of sources and supply and Rural and social development. The use of locally produced biomass for bioenergy can displace the consumption of fossil fuels and/or traditional use of biomass for energy, which would have significant positive impacts on the economic development and energy security of a country or region

RSPO RED (✓)

5.4.1 A plan for improving efficiency of the use of fossil fuels and to optimise renewable energy shall be in place and monitored.

RTRS EU RED (✓)

4.3.1 Total direct fossil fuel use over time is recorded, and its volume per hectare and per unit of product for all activities related to soy production is monitored.

4.3.2 If there is an increase in the intensity of fossil fuel used, there is a justification for this. If no justification is available there is an action plan to reduce use.

CI 12. Energy Saving Practices: Energy use reduction, preferably by enhancing energy efficiency

RSPO (✓)

5.4.1. A plan for improving efficiency of the use of fossil fuels and to optimise renewable energy shall be in place and monitored.

Bonsucro (✓)

(Criterion 5.4 To promote energy efficiency)

5.4.1 Total Net Primary Energy Usage per kg product

5.4.2 Energy used in cane transport per ton cane transported

Primary energy use per ton of sugarcane.

CI 13. Practices to diminish GHG emissions

GBEP (✓)

1 Lifecycle GHG emissions. (...) Life Cycle Assessment (LCA) is an important tool for estimating GHG emissions and comparing the GHG emissions from different energy sources at the national level (...)

RED (✓)

DIRECTIVE 2009/28/EC. Article 17.

2.The greenhouse gas emission saving from the use of biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall be at least 35 %.

With effect from 1 January 2017, the greenhouse gas emission saving from the use of biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall be at least 50 %. From 1 January 2018 that greenhouse gas emission saving shall be at least 60 % for biofuels and bioliquids produced in installations in which production started on or after 1 January 2017.

The greenhouse gas emission saving from the use of biofuels and bioliquids shall be calculated in accordance with Article 19(1).

In the case of biofuels and bioliquids produced by installations that were in operation on 23 January 2008, the first subparagraph shall apply from 1 April 2013.

RSB (GLOBAL) (✓)

(Principle 3. Biofuels shall contribute to climate change mitigation by significantly reducing lifecycle GHG emissions as compared to fossil fuels)

RSPO RED (✓)

(Criterion 7.8. New plantation developments are designed to minimise net greenhouse gas emissions)

7.8.1 (M) The carbon stock of the proposed development area and major potential sources of emissions that may result directly from the development shall be identified and estimated.

7.8.2 There shall be a plan to minimise net GHG emissions which takes into account avoidance of land areas with high carbon stocks and/or sequestration options.

R2(v) Greenhouse gas criterion

One of the following options must be used to for the EU-RED greenhouse gas criterion:

(a) Use of a default value specified in Annex V of EU-RED, which complies with the 35% greenhouse gas reduction criterion specified in EU-RED (and the 50% greenhouse gas reduction criterion from 1 January 2017). Indicators:

- There shall be evidence that methane (biogas) capture from palm oil mill effluent (POME) is used.
- Supply chain operators shall clearly communicate to the next economic operator that the default value option is being applied for the EU-RED greenhouse gas criterion. The relevant default value (g CO₂eq/MJ) shall also be communicated to the next economic operator.

(b) Use of actual greenhouse gas values to calculate total greenhouse gas savings according to the EU-RED methodology. Indicators:

- Producers shall use an EC approved greenhouse gas methodology.
- Supply chain operators shall clearly communicate to the next economic operator which calculation methodology is being applied. Disaggregated (actual and default) greenhouse gas data shall be communicated to the next economic operator.
- Records of greenhouse gas data and calculations shall be kept for 5 years.

(c) Until 31 March 2013, palm oil can be claimed to be in compliance with the EU-RED greenhouse gas criterion if there is evidence that the palm oil mill was in operation on or before 23 January 2008 (this is the grandfathering option). From 1 April 2013 no scheme-compliant claim can be made without meeting the EU-RED greenhouse gas threshold, regardless of when the palm oil was processed. Indicator:

- In order to use the grandfathering clause by producers, there shall be evidence that the palm oil mill was in operation on or before 23 January 2008.
- Supply chain operators shall clearly communicate to the next economic operator that the grandfathering clause is being applied for the EU-RED greenhouse gas criterion.

RTRS EU RED (✓)

(Criterion 4.3 Efforts are made to reduce emissions and increase sequestration of Greenhouse Gases (GHGs) on the farm)

RED Requirements:

1.1 Greenhouse gas (GHG) emissions from soy cultivation are measured and recorded.

1.2 Greenhouse gas (GHG) emissions from land use are calculated and recorded

1.3 Greenhouse gas (GHG) emissions from transport of soybeans are calculated and recorded

1.4 Greenhouse gas (GHG) emissions are calculated and communicated to the next economic operator in the supply chain.

Bonsucro EU (✓)

6.1.1 Global warming burden per unit of energy.

Greenergy (✓)

I.1.1.1 Evidence that biomass production has not caused direct land use change, on or after 1 January 2008, which results in GHG emissions not meeting the minimum threshold for greenhouse gas savings.

CI 14. Practices to increase carbon dioxide sequestration

RED (~)

DIRECTIVE 2009/28/EC. Article 17.

3. Biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall not be made from raw material obtained from land with high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have that status:

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

(b) areas designated:

(i) by law or by the relevant competent authority for nature protection purposes;
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 second subparagraph of Article 18(4);

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

(c) highly biodiverse grassland that is:

(i) natural, namely grassland that would remain grassland in the absence of human intervention and which 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 which is species-rich and not degraded, unless evidence is provided that the harvesting of the raw material is necessary to preserve its grassland status.

The Commission shall establish the criteria and geographic ranges to determine which grassland shall be covered by point (c) of the first subparagraph. Those measures, designed to amend non-essential elements of this Directive, by supplementing it shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 25(4).

4. Biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall not be made from raw material obtained from land with high carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status:

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

(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, unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology laid down in part

C of Annex V is applied, the conditions laid down in paragraph 2 of this Article would be fulfilled.

The provisions of this paragraph shall not apply if, at the time the raw material was obtained, the land had the same status as it had in January 2008.

5. Biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.

RSPO RED (✓)

7.8.2 There shall be a plan to minimise net GHG emissions which takes into account avoidance of land areas with high carbon stocks and/or sequestration options.

RTRS EU RED (✓)

4.3.3 Soil organic matter is monitored to quantify change in soil carbon and steps are taken to mitigate negative trends.

4.3.4 Opportunities for increasing carbon sequestration through restoration of native vegetation, forest plantations and other means are identified.

RED Requirements:

2.2 There is no conversion of high carbon areas

2.2.1 There is evidence that no conversion of high carbon stock areas has occurred since January 2008. Land with high carbon stock status is:

- Land that is covered with or saturated by water permanently or for a significant part of the year.
- Peatland
- Continuously forested areas
- Land spanning more than one hectare with trees higher than five meters and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds in situ, unless evidence is provided that the GHG emissions for the whole supply chain meet the 35% savings threshold.

2.2.2 For land defined as peatland according to its soil type, that was partially drained in January 2008, a subsequent deeper drainage, affecting soil that was not already fully drained, would constitute a breach of the criterion.

2.2.3 For land defined as wetland according to its hydrological status, no drainage occurred since January 2008 that led to losing this status

Bonsucro EU (~)

6.1.2 Percentage of land with high biodiversity value, high carbon stock or peatlands planted to sugarcane after the cut-off date of 1 January 2008.

ISCC (~)

2.3.1 Good agricultural practices must be applied with respect to: Prevention and control of erosion, maintaining and improving soil nutrient balance, soil organic matter, soil pH, soil structure, soil biodiversity and prevention of salinization. A soil management plan aimed at sustainable soil management, erosion prevention and erosion control must be documented. Annual documentation of applied good agricultural practices with respect to the abovementioned aspects must be in place

2.3.2 Field cultivation techniques used to reduce the possibility of soil erosion.

CI 16. Practices to diminish spread of invasive introduced species and new pests or diseases

GBEP (✓)

7 Biological diversity in the landscape. (7.2) Area and percentage of the land used for bioenergy production where nationally recognized invasive species, by risk category, are cultivated (...) Invasive species can threaten biodiversity, food security, human health, trade, transport and economic development.

RED (~)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Landscape, minimum level of maintenance. Retention of landscape features, including where appropriate, hedges, ponds, ditches, trees in line, in group or isolated, field margins and terraces, and including a ban on cutting hedges and trees during the bird breeding and rearing season and, as an option, measures for avoiding invasive plant species.

RSB (GLOBAL) (✓)

(Criterion 7e. Biofuel operations shall prevent invasive species from invading areas outside the operation site)

7.e.i.5. The participating operator provides objective evidence demonstrating that specific measures are implemented which prevent and mitigate the risk of invasion during cultivation, harvesting, processing, transport and trade.

RSPO RED (✓)

(Criterion 4.5. Pests, diseases, weeds and invasive introduced species are effectively managed using appropriate Integrated Pest Management techniques)

RTRS EU RED (✓)

(Criterion 5.8. Systematic measures are planned and implemented to monitor, control and minimize the spread of invasive introduced species and new pests)

5.8.1 Where there are institutional systems in place to identify and monitor invasive introduced species and new pests, or major outbreaks of existing pests, producers follow the requirements of these systems, to minimize their spread.

5.8.2 Where such systems do not exist, incidences of new pests or invasive species and major outbreaks of existing pests are communicated to the proper authorities and relevant producer organizations or research organizations

(Criterion 5.11. Origin of seeds is controlled to improve production and prevent introduction of new diseases)

5.11.1 All purchased seed must come from known legal quality sources.

5.11.2 Self-propagated seeds may be used, provided appropriate seed production norms are followed and legal requirements regarding intellectual property rights are met.

Greenergy (✓)

14.2.3 Pests, diseases and weeds are effectively managed using appropriate Integrated Pest Management (IPM) techniques. Guidance: Alternative methods for the control of pests, diseases and invasive plants (mechanical, physical and biological) should be used where possible.

ISCC (✓)

2.1.3 The cultivation of highly invasive species shall be prevented

If a species is officially prohibited in the country of operation, it shall not be cultivated. The introduction of alien species, which are not already established in

the country or region, which show a high risk of invasive behaviour in a region, is prohibited or shall be in line with existing regulatory frameworks for such an introduction

GGL-Agri (✓)

Principle 5 The agricultural management system has implemented integrated pest management and control.

Criteria: 5.1 The management system is based on an integrated system of pest control.

5.2 The use of banned pesticides is prohibited.

5.3 The use of restricted pesticides is controlled and a administration is kept up to date. Stock is kept in a separate and locked storage.

5.4 Biological control agents and organic pesticides, as well as traditional knowledge and skills regarding alternatively non-chemical pest control have to be identified and implemented in the agricultural management system.

CI 17. "Responsible" application of agrochemicals (in the case of forestry minimize or eliminate) and biological control agents

GBEP (~)

6. Water quality

(6.1) Annual nitrogen (N) and phosphorus (P) loadings from fertiliser and pesticide active ingredient loadings attributable to bioenergy feedstock production (per watershed area):

- in kg of N, P and active ingredient per ha per year
- as percentages of total N, P and pesticide active ingredient loadings from agriculture in the watershed

(6.2) Pollutant loadings attributable to bioenergy processing effluent:

- pollutant levels in bioenergy processing effluents in mg/l (for pollutant concentrations and biochemical and chemical oxygen demand – BOD and COD), and (if also measured) °C (for temperature), µS/m (for electrical conductivity) and pH
- total annual pollutant loadings in kg/year or (per watershed area) in kg/ha/year

- as a percentage of total pollutant loadings from agricultural processing in the watershed

7 Biological diversity in the landscape. (...) Relevant conservation methods can include the following: (...)

- integrated pest management;

(...)

RED (~)

(EU) No 1306/2013. Title VI. Chapter I. Article 93. Annex II. Cross compliance. Area: Public health, animal health and plant health. Plant protection products

RSB (GLOBAL) (✓)

(Criterion 11d. Good practices shall be implemented for the storage, handling, use, and disposal of biofuels and chemicals)

11.d.i.1. The participating operator provides objective evidence demonstrating that there is no storage or use of any chemicals recorded in the WHO's 1a and 1b lists.

11.d.i.2. The participating operator has listed in the ESMP the type and annual volume used of chemicals listed in the Stockholm Convention or in Annex III of the Rotterdam Convention and provides objective evidence demonstrating that a plan to eliminate the use of such chemicals within three years following the first certification is and implemented.

11.d.i.4. The participating operator provides objective evidence that manufacturer's safety instructions for the storage, handling, use and disposal of chemicals are strictly implemented.

SBP (✓)

2.2.8. The BP has control systems and procedures for verifying that there is controlled and appropriate use of chemicals, and that Integrated pest management (IPM) is implemented wherever possible in forest management activities (CPET S5c).

RSPO RED (✓)

4.2.2 Records of fertiliser inputs shall be maintained.

(Criterion 4.5. Pests, diseases, weeds and invasive introduced species are effectively managed using appropriate Integrated Pest Management techniques)

(Criterion 4.6. Pesticides are used in ways that do not endanger health or the environment)

4.6.1 (M) Justification of all pesticides used shall be demonstrated. The use of selective products that are specific to the target pest, weed or disease and which have minimal effect on non-target species shall be used where available.

4.6.2 (M) Records of pesticides use (including active ingredients used and their LD50, area treated, amount of active ingredients applied per ha and number of applications) shall be provided.

4.6.3 (M) Any use of pesticides shall be minimised as part of a plan, and in accordance with Integrated Pest Management (IPM) plans. There shall be no prophylactic use of pesticides, except in specific situations identified in national Best Practice guidelines.

4.6.4 Pesticides that are categorised as World Health Organisation Class 1A or 1B, or that are listed by the Stockholm or Rotterdam Conventions, and are not used, except in specific situations identified in national Best Practice guidelines. The use of such pesticides shall be minimised and eliminated as part of a plan, and shall only be used in exceptional circumstances.

4.6.5 (M) Pesticides shall only be handled, used or applied by persons who have completed the necessary training and shall always be applied in accordance with the product label. Appropriate safety and application equipment shall be provided and used. All precautions attached to the products shall be properly observed, applied, and understood by workers (see Criterion 4.7).

4.6.6 (M) Storage of all pesticides shall be according to recognised best practices. All pesticide containers shall be properly disposed of and not used for other purposes (see Criterion 5.3).

4.6.7 Application of pesticides shall be by proven methods that minimise risk and impacts.

4.6.8 (M) Pesticides shall be applied aurally only where there is documented justification. Communities shall be informed of impending aerial pesticide applications with all relevant information within reasonable time prior to application.

4.6.9 Maintenance of employee and associated smallholder knowledge and skills on pesticide handling shall be demonstrated, including provision of appropriate information materials (see Criterion 4.8).

4.6.10 Proper disposal of waste material, according to procedures that are fully understood by workers and managers shall be demonstrated (see Criterion 5.3).

4.6.11 (M) Specific annual medical surveillance for pesticide operators, and documented action to treat related health conditions, shall be demonstrated.

4.6.12 (M) No work with pesticides shall be undertaken by pregnant or breast-feeding women.

RTRS EU RED (✓)

(Criterion 5.4 Negative environmental and health impacts of phytosanitary products are reduced by implementation of systematic, recognized Integrated Crop Management (ICM) techniques)

5.4.1. A plan for ICM is documented and implemented which addresses the use of prevention, and biological and other non-chemical or selective chemical controls.

5.4.2 There is an implemented plan that contains targets for reduction of potentially harmful phytosanitary products over time.

5.4.3 Use of phytosanitary products follows legal requirements and professional recommendations (or, if professional recommendations are not available, manufacturer's recommendations) and includes rotation of active ingredients to prevent resistance.

5.4.4 Records of monitoring of pests, diseases, weeds and natural predators are maintained.

(Criterion 5.5 All application of agrochemicals is documented and all handling, storage, collection and disposal of chemical waste and empty containers, is monitored to ensure compliance with good practice)

5.5.1 There are records of the use of agrochemicals, including:

- a) products purchased and applied, quantity and dates;
- b) identification of the area where the application was made;
- c) names of the persons that carried out the preparation of the products and field application;
- d) identification of the application equipment used;
- e) weather conditions during application.

5.5.2 Containers are properly stored, washed and disposed of; waste and residual agrochemicals are disposed in an environmentally appropriate way.

5.5.3 Transportation and storage of agrochemicals is safe and all applicable health, environmental and safety precautions are implemented.

5.5.4 The necessary precautions are taken to avoid people entering into recently sprayed areas.

5.5.5 Fertilisers are used in accordance with professional recommendations (provided by manufacturers where other professional recommendations are not available).

(Criterion 5.6 Agrochemicals listed in the Stockholm and Rotterdam Conventions are not used)

5.6.1 There is no use of agrochemicals listed in the Stockholm and Rotterdam Conventions.

5.6.2 The use of Paraquat and Carbofuran is eliminated by June 2017.

5.6.3 During this phasing out period the use of Carbofuran and Paraquat should be controlled, if possible reduced according an Integrated Crop Management (ICM) plan developed by the producer, which explains under what specific circumstances the use of Paraquat and Carbofuran is allowed.

Note for 5.6.2: In the Case of Paraquat, the deadline for the prohibition for its use by June 2017 could be extended by the RTRS if enough evidence is put forward before June 2016 to demonstrate that at the time there are still no alternatives in the market (globally or locally), that can substitute it with less environmental and human risks and with similar costs.

(Criterion 5.7 The use of biological control agents is documented, monitored and controlled in accordance with national laws and internationally accepted scientific protocols)

5.7.1 There is information about requirements for use of biological control agents.

5.7.2 Records are kept of all use of biological control agents that demonstrate compliance with national laws.

Bonsucro EU (✓)

4.1.4. Ratio of fertiliser N and P applied (expressed in eq. phosphate) to fertiliser N and P recommended by soil or leaf analysis (expressed in eq. phosphate)

4.1.5. Agrochemicals applied per hectare per year

4.1.6. Banned agro-chemicals applied per hectare per year.

Greenergy (✓)

I4.2.2 Documented operating procedures for good agricultural practices must be implemented and monitored with respect to:

- Efficient water usage
- Responsible use of agro-chemicals
- Waste discharge

I4.2.4 Justification for all chemical use must be documented, with no prophylactic use, and records of use maintained.

I3.1.1 No evidence of noncompliance with national and local laws and regulations with respect to:

- Pesticides and agrochemicals
- Fertiliser

Means of verification: Agrochemicals are stored in a manner consistent with legal requirements

I4.2.3 Pests, diseases and weeds are effectively managed using appropriate Integrated Pest Management (IPM) techniques.

ISCC-EU (✓)

(Criterion 2.6 Use of fertiliser)

(Criterion 2.8 Use of Plant Protection Products (PPP))

(Criterion 2.9 Plant Protection Product Storage)

GGL-Agri (✓)

Principle 6 The agricultural management system has implemented sustainable plant nutrition to increase food production.

Criteria: 6.1 The management plan is based on an integrated plant nutrition approach.

6.2 The availability of fertiliser and other plant nutrient resources are optimised.

CI 18. Avoid harvesting of threatened or endangered plant species

GBEP (~)

7. Biological diversity in the landscape. (...)

Data sources: If nationally agreed areas do not exist, the following may be useful sources:

- national maps on the distribution of (threatened and/or endemic) species to identify new areas of high biodiversity importance;

RSB (✓)

7.a.i.10. The participating operator provides objective evidence demonstrating that no hunting, fishing, ensnaring, poisoning and exploitation of rare, threatened, endangered and legally protected species is ongoing on her/his/its biomass/biofuels operation(s).

SBP (✓)

1.3.1 The Biomass Producer has control systems and procedures to ensure that feedstock is in compliance with EUTR legality requirements.

Guidance: (...) Applicable legislation includes that in force in the country of harvest, covering the following aspects: (...)

- Biodiversity conservation, (including rare, threatened and endangered species and ecosystems) (...)

RSPO (✓)

(Criterion 5.2. The status of rare, threatened or endangered species and other High Conservation Value habitats, if any, that exist in the plantation or that could be affected by plantation or mill management, shall be identified and operations managed to best ensure that they are maintained and/or enhanced.

5.2.2 (M) Where rare, threatened or endangered (RTE) species, or HCVs, are present or are affected by plantation or mill operations, appropriate measures that are expected to maintain and/or enhance them shall be implemented through a management plan.

RTRS (✓)

(Criterion 4.5. On-farm biodiversity is maintained and safeguarded through the preservation of native vegetation)

4.5.3 No hunting of rare, threatened or endangered species takes place on the property.

Bonsucro (✓)

6.1.2 Percentage of land with high biodiversity value, high carbon stock or peatlands planted to sugarcane after the cut-off date of 1 January 2008. Notes: (b) areas designated by law or by the relevant competent authority for nature protection purposes; or 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 by the European Commission; unless evidence is provided that the production of that raw material did not interfere with those nature protection purposes;

Greenergy (~)

I2.3.1 Documentation of the status of rare, threatened or endangered species and high conservation value habitats in and around the production site.

ISCC-EU (✓)

1.1 Biomass is not produced on land with high biodiversity value. (...)

(3) Areas for the protection of rare, threatened or endangered ecosystems or species

GGL_Forest (✓)

2.2g Plans for the identification and protection of rare, threatened and/or endangered species.

CI 19. Maintain or restore of areas of water influence

GBEP (✓)

7. Biological diversity in the landscape. (...) Conservation methods currently exist, or are in development for many different crops, landscapes, and national contexts . These methods range from those related to cultivation practice to those that focus on the wider agricultural landscape (e.g. maintenance of corridors and buffer zones). (...)

RSB (GLOBAL) (✓)

7.c.i.1. The participating operator provides objective evidence demonstrating that buffer zones are protected, restored or created within the site(s) of her/his/its biomass/biofuels operation(s) around areas with conservation values of local, regional or global importance.

7.c.i.2. The participating operator provides objective evidence demonstrating that buffer zones are effective in mitigating potential negative impacts of the biofuel/biomass operations on areas that are contiguous to the operation site and, within the operation site, on any area containing conservation value(s) of local, regional or global importance.

RSPO RED (✓)

4.4.2 (M) Protection of water courses and wetlands, including maintaining and restoring appropriate riparian and other buffer zones (refer to national best practice and national guidelines) shall be demonstrated.

RTRS EU RED (✓)

(Criterion 5.2 Natural vegetation areas around springs and along natural watercourses are maintained or re-established)

5.2.1 The location of all watercourses has been identified and mapped, including the status of the riparian vegetation.

5.2.2 Where natural vegetation in riparian areas has been removed there is a plan with a timetable for restoration which is being implemented.

5.2.3 Natural wetlands are not drained and native vegetation is maintained.

ISCC-EU (✓)

2.1.2 Where production of raw material does not interfere with protection purposes (set in Principle 1), appropriate management measures shall be implemented to avoid damage or deterioration of habitats.

(...) Around all protected areas (covered in Principle 1), set aside land or wildlife corridors, appropriate buffer zones shall be protected, restored or set up.

2.2.1 Natural vegetation areas around springs and natural watercourses are maintained or re-established.

The producer knows the status of riparian vegetation. Setting up, maintaining or restoring appropriate riparian buffer zones protects watercourses and wetlands. Where natural vegetation in riparian areas has been removed there is a plan with a timetable for recovery.

2.5.3 Application of good agricultural practices to reduce water usage and to maintain and improve water quality

(...)

Appropriate management measures to improve water quality could include inter alia setting up buffer zones around water bodies, (...).

CI 20. Monitor periodically key biotic and abiotic factors that might affect health and vitality of ecosystems

SBP (✓)

2.4.1. The BP has control systems and procedures for verifying that the health, vitality and other services provided by forest ecosystems are maintained or improved (CPET S7a).

2.4.2. The BP has control systems and procedures for verifying that natural processes, such as fires, pests and diseases are managed appropriately (CPET S7b).

RSPO RED (~)

(Criterion 4.5. Pests, diseases, weeds and invasive introduced species are effectively managed using appropriate Integrated Pest Management techniques)

RTRS EU RED (✓)

(Criterion 5.11. Origin of seeds is controlled to improve production and prevent introduction of new diseases)

5.11.1 All purchased seed must come from known legal quality sources.

5.11.2 Self-propagated seeds may be used, provided appropriate seed production norms are followed and legal requirements regarding intellectual property rights are met.

ISCC (✓)

2.7 Integrated Pest Management (IPM)

2.7.2 The producer can show evidence of implementation of at least one activity that falls in the category of "Prevention"

2.7.3 The producer can show evidence of implementation of at least one activity that falls in the category of "Observation and Monitoring"

GGL-Agri (✓)

Principle 5 The agricultural management system has implemented integrated pest management and control.

GGL-Forest (✓)

Principle 3 Environmental impact

Criteria 3.1 The forest management is aimed at conservation of biological diversity and forest integrity, water resources, soils, unique ecosystems and landscapes

3.2 The following issues are included in the management plan:

3.2a Environment in general: (...)

VIII. Disease and pest management.

CI 21. Avoid planting in certain areas to protect soils**RSPO (✓)**

7.4. Extensive planting on steep terrain, and/or marginal and fragile soils, including peat, is avoided.

Greenergy (~)

13.2.2 Documented operating procedures for good agricultural practices must be implemented and monitored with respect to:

- Prevention and control of erosion
- Maintaining soil fertility.

Guidance: (...) Contour planting of sugarcane is a method of soil conservation employed in hilly areas

ISCC-EU (✓)

2.3.1 Conservation of soils

(...)Topographical characteristics must also be considered.

2.3.2 Field cultivation techniques used to reduce the possibility of soil erosion Evidence of measures of reduced soil erosion is available. 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 to 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).

CI 22. Soil surface mechanically tilled per year (% of cultivated area)

Bonsucro (✓)

5.2.4. Soil surface mechanically tilled per year (% of cultivated area)

ISCC (✓)

2.3.1 Conservation of soils

(...) Appropriate management measures include inter alia crop rotations and intercropping, landscaping elements or an appropriate type and use of machinery. (...)

2.4.4 Techniques have been used that improve or maintain soil structure and avoid 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.

CI 23. Measures for soil conservation

GBEP (✓)

2 Soil quality

RSB (GLOBAL) (✓)

(Criterion 8a. Operators shall implement practices to maintain or enhance soil physical, chemical, and biological conditions)

SBP (✓)

2.2.2 The BP has control systems and procedures for verifying that feedstock is sourced from forests where management maintains or improves soil quality

RSPO RED (✓)

(Criterion 4.2. Practices maintain soil fertility at, or where possible improve soil fertility to, a level that ensures optimal and sustained yield)

RTRS EU RED (✓)

5.4.1 A plan for ICM is documented and implemented which addresses the use of prevention, and biological and other non-chemical or selective chemical controls.

Annex 5: Integrated Crop Management (ICM) Measures and Practices in Soy Production

2. Technical measures for cultivation

2e. mechanical weed removal / intercultural operations which are not detrimental to soil structure, organic matter content or other soil and water values

(Criterion 5.3 Soil quality is maintained or improved and erosion is avoided by good management practices)

Note: For group certification - 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.

Bonsucro EU (✓)

(5.2 To continuously improve the status of soil and water resources)

5.2.3 % Ground cover of tops or leaves after harvest

5.2.4 Soil surface mechanically tilled per year (% of cultivated area)

5.2.5 Percentage fields with samples showing analyses within acceptable limits for pH

Greenergy (✓)

(Criterion 3.2 Application of good agricultural practices with respect to:

- 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 salinisation)

ISCC-EU (✓)

(Criterion 2.3 Soil conservation and avoidance of soil degradation)

2.3.1 Conservation of soils

Crops should be grown on suitable soils. In order to ensure a 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:

- 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.

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 abovementioned aspects must be in place. Applying precautionary measures prevents soil degradation. Appropriate management measures include inter alia crop rotations and intercropping, landscaping elements or an appropriate type and use of machinery. In order to maintain or improve soil conditions, periodic soil analysis shall be conducted, on e.g. soil pH, macro- and micronutrients or soil organic matter.

2.4.4 Techniques have been used that improve or maintain soil structure and avoid 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.

GGL-Agri (✓)

3.3 The general planning, management and utilization of land resources and the preservation of soil fertility are defined and executed.

4.5 Measures have to be taken to minimize soil run-of and sedimentation.

GGL-Forest (✓)

(Principle 3 Environmental impact)

3.2a Environment in general: (...)

VI. Measures taken to prevent erosion, improve soil conditions, etc.

CI 24. Percentage fields with samples showing analyses within acceptable limits for pH**Bonsucro (✓)**

5.2.5. Percentage fields with samples showing analyses within acceptable limits for pH

ISCC (~)

2.3 Soil conservation and avoidance of soil degradation

2.3.1 Good agricultural practices must be applied with respect to: Prevention and control of erosion, maintaining and improving soil nutrient balance, soil organic matter, soil pH, soil structure, soil biodiversity and prevention of salinization. A soil management plan aimed at sustainable soil management, erosion prevention and erosion control must be documented. Annual documentation of applied good agricultural practices with respect to.

CI 25. Avoid natural water contamination**GBEP (✓)**

6. Water quality.

(6.1) Pollutant loadings to waterways and bodies of water attributable to fertiliser and pesticide application for bioenergy feedstock production, and expressed as a percentage of pollutant loadings from total agricultural production in the

watershed. (...) Fertiliser and pesticide applications exceeding plant uptake and soil retention capacity can lead to water pollution.

RSB (✓)

9.b.i.6. The participating operator provides objective evidence demonstrating that any negative impacts resulting directly or indirectly from her/his/its biomass/biofuels operation(s) on the water resources of the neighbouring areas are mitigated fully.

9.d.i.3. The participating operator provides objective evidence demonstrating that sufficient precautions have been taken to contain effluents from her/his/its biomass/biofuels operation(s) and prevent contamination of water resources. This includes treatment and/or recycling of waste water and the establishment of buffer zones

SBP (✓)

2.2.6 The BP has control systems and procedures to verify that negative impacts on ground and surface water from forest management are minimized.

RSPO RED (✓)

4.4.1 An implemented water management plan shall be in place.

Guidance:(...)

- Avoid contamination of surface and ground water through run-off of soil, nutrients or chemicals, or as a result of inadequate disposal of waste including Palm Oil Mill Effluent (POME).

RTRS EU RED (✓)

5.1.1 Good agricultural practices are implemented to minimize diffuse and localized impacts on surface and ground water quality from chemical residues, fertilisers, erosion or other sources and to promote aquifer recharge.

Bonsucro EU (✓)

4.1.5 Agrochemicals applied per hectare per year. Notes: To minimise air, soil and water contamination

Greenergy (✓)

14.2.1 Documentation of water management plan aimed at sustainable water use and prevention of water pollution.

ISCC-EU (✓)

(Criterion 2.5 Ground water and irrigation)

2.5.1 Mineral oil products and plant protection products are stored in an appropriate manner, which reduces the risk of contaminating the environment. The storages of the material are consistent with best available technology and respective laws and prevent contamination by the stored materials.

2.5.3 Application of good agricultural practices to reduce water usage and to maintain and improve water quality

Good agricultural practices are implemented to reduce the unsustainable water use, the abstraction of unsustainable water sources and to minimize diffuse and localized inputs of chemical residues, fertilisers, erosion or other pollution sources to ground and surface water.

(...)Any direct evidence of localized contamination of water bodies (ground- or surface waters) is reported to local authorities and – if requested – monitored in collaboration with the authorities.

GGL- Agri (~)

4.4 Water quality has to be monitored on biological, physical and chemical quality.

CI 26. Promote gender equality**RSB (✓)**

4.d.i.1. Workers engaged in the operation(s) of the participating operator confirm that they are not subjected to any form of discrimination in hiring, remuneration, benefits, access to training, promotion, termination, retirement or any other aspect of employment, based on race, colour, gender, religion, political opinion, national extraction, social origin, sexual orientation, family responsibilities, marital status, union membership, age or any other condition that could give rise to discrimination.

(Criterion 2b. Free, Prior & Informed Consent (FPIC) shall form the basis for the process to be followed during all stakeholder consultation, which shall be gender sensitive and result in consensus-driven negotiated agreements)

RSPO RED (~)

6.4.2 A procedure for calculating and distributing fair compensation (monetary or otherwise) shall be established and implemented, monitored and evaluated in a participatory way, and corrective actions taken as a result of this evaluation. This procedure shall take into account: gender differences in the power to claim rights, ownership and access to land; differences of transmigrants and long-established communities; and differences in ethnic groups' proof of legal versus communal ownership of land.

Greenergy (~)

16.9.1 No evidence of discrimination based on individual characteristics and group membership or association like: Race, Caste, National Origin, Religion, Disability, Gender, Sexual Orientation, Union Membership, Political Affiliation, Age, marital status and those with HIV/AIDS, seasonal, migrant and temporary workers

ISCC-EU (~)

(Criterion 4.3 There is no indication of discrimination (distinction, exclusion or preference) practiced that denies or impairs equality of opportunity, conditions or treatment based on individual characteristics and group membership or association. For example, on the basis of: race, caste, nationality, religion, disability, gender etc.)

A publicly available equal opportunities policy including identification of relevant/affected groups in the local environment exists.

CI 27. Availability of a mutually agreed and documented system for dealing with complaints and grievances, which is implemented and accepted by all affected parties

SBP (~)

2.6.1 The BP has control systems and procedures for verifying that appropriate mechanisms are in place for resolving grievances and disputes, including those relating to tenure and use rights, to forest management practices and to work conditions.

RSPO (✓)

(Criterion 6.3. There is a mutually agreed and documented system for dealing with complaints and grievances, which is implemented and accepted by all affected by all parties)

6.3.1 (M) The system, open to all affected parties, shall resolve disputes in an effective, timely and appropriate manner, ensuring anonymity of complainants and whistleblowers, where requested.

6.3.2 (M) Documentation of both the process by which a dispute was resolved and the outcome shall be available.

RTRS (✓)

(Criterion 3.3 A mechanism for resolving complaints and grievances is implemented and available to local communities and traditional land users)

Note: For group certification - the complaints and grievances mechanism can be managed by the group manager and records of complaints and grievances can be maintained at the group level.

3.3.1 The complaints and grievances mechanism has been made known and is accessible to the communities.

3.3.2 Documented evidence of complaints and grievances received is maintained.

3.3.3 Any complaints and grievances received are dealt with in a timely manner.

Bonsucro (✓)

5.8.1. Existence of usage of a recognised and accessible grievance and dispute resolution mechanism for all stakeholders

ISCC-EU (✓)

4.12 There is a complaint form and/or procedure available on the farm, where employees and affected communities can make a complaint

A complaint form and/or procedure are available for farm employees and surrounding communities. They have been made aware of its existence and complaints or suggestions can be made at any time. Complaints are dealt with in a timely manner. Complaints and their solutions from the last 24 months are documented and accessible.

CI 28. Use local processing, local services, and local value adding.

RSB (GLOBAL) (✓)

Criterion 5.a In regions of poverty, the socioeconomic status of local stakeholders impacted by biofuel operations shall be improved.

RSPO (✓)

(Criterion 6.11. Growers and millers contribute to local sustainable development where appropriate)

Indicators:

6.11.1 Contributions to local development that are based on the results of consultation with local communities shall be demonstrated.

6.11.2 Where there are scheme smallholders, there shall be evidence that efforts and/or resources have been allocated to improve smallholder productivity.

RTRS EU RED (✓)

3.4.3. Opportunities for supply of goods and services are offered to the local population

ISCC (~)

4.20 Other forms of social benefits are offered by the employer to employees, their families and/or local community.

CI 29. Benefit sharing mechanism

RSPO RED (✓)

2.3.3 All relevant information shall be available in appropriate forms and languages, including assessments of impacts, proposed benefit sharing, and legal arrangements.

ISCC (✓)

3.1.5 There are records kept for training activities and attendees

(...) If useful, it is possible to collaborate with training programs for the local population.

4.20 Other forms of social benefits are offered by the employer to employees, their families and/or local community.

CI 30. Support to Vulnerable People

GBEP (~)

10. Price and supply of a national food basket. (...) Mapping these areas and identifying the most vulnerable groups would be quite useful in this context, as it would help countries target the analysis of the domestic impacts of bioenergy, and increase cost-effectiveness of the analysis by starting with these most vulnerable groups and/or areas.(...)

RSB (GLOBAL) (✓)

(Criterion 5b. In regions of poverty, special measures that benefit and encourage the participation of women, youth, indigenous communities and the vulnerable in biofuel operations shall be designed and implemented)

5.b.i.1. The participating operator provides objective evidence demonstrating that the management of the biomass/biofuels operation(s) has sufficient understanding of gender issues and issues that relate to youth, indigenous people and vulnerable people.

5.b.i.2. The participating operator provides objective evidence demonstrating that a social plan has been agreed with directly impacted stakeholders which includes special measures to benefit women, youth, indigenous people and vulnerable people and involve them in the biomass/biofuels operation(s) of the participating operator.

5.b.i.3. Women, youth, indigenous people and vulnerable people confirm that the social plan agreed as per indicator 5.b.i.2. is implemented and that benefits are received.

RSPO (~)

4.8.1(M) A formal training programme shall be in place that covers all aspects of the RSPO Principles and Criteria, and that includes regular assessments of training needs and documentation of the programme. Guidance: Workers should be adequately trained on: the health and environmental risks of pesticide exposure;

recognition of acute and long-term exposure symptoms including the most vulnerable groups (e.g. young workers, pregnant women); ways to minimise exposure to workers and their families; and international and national instruments or regulations that protect workers' health.

ISCC (✓)

4.20 Other forms of social benefits are offered by the employer to employees, their families and/or local community.

CI 31. Rights of indigenous peoples & local communities -defined in the United Nations Declaration on the Rights of Indigenous Peoples (2007) and ILO Convention 169 (1989).

RSB (✓)

(Principle 5. In regions of poverty, biofuel operations shall contribute to the social and economic development of local, rural and indigenous people and communities)

(Criterion 9a. Biofuel operations shall respect the existing water rights of local and indigenous communities)

SBP (~)

2.5.1 The BP has control systems and procedures for verifying that legal, customary and traditional tenure and use rights of indigenous people and local communities related to the forest, are identified, documented and respected

ISSC (✓)

5.1 The producer can prove that the land is used legitimately and that traditional land rights have been secured

Documents show legal ownership or lease, history of land tenure and the actual legal use of the land. The producer must identify and respect existing land rights (see Principle 1). The rights of indigenous people are respected.

CI 32. Existence of conflict management mechanisms

GBEP (✓)

9. Allocation and tenure of land for new bioenergy production. (...) Information about qualitative aspects of the issuing of new bioenergy concessions, in particular whether:

(...)

e) there is effective access to fair adjudication, including the court system or other dispute resolution processes (FAO, 2002a) (...)

RSB (GLOBAL) (~)

12.b.i.7. The participating operator provides objective evidence demonstrating that no land rights and/or land use rights disputes related to her/his/its biomass/biofuels operation(s) are pending unresolved.

SBP (✓)

2.6.1. The BP has control systems and procedures for verifying that appropriate mechanisms are in place for resolving grievances and disputes, including those relating to tenure and use rights, to forest management practices and to work conditions.

RSPO RED (✓)

2.2.4 (M) There shall be an absence of significant land conflict, unless requirements for acceptable conflict resolution processes (see Criteria 6.3 and 6.4) are implemented and accepted by the parties involved.

RTRS EU RED (✓)

(Criterion 3.2 In areas with traditional land users, conflicting land uses are avoided or resolved)

3.2.1 In the case of disputed use rights, a comprehensive, participatory and documented community rights assessment is carried out.

(Criterion 3.3 A mechanism for resolving complaints and grievances is implemented and available to local communities and traditional land users)

Bonsucro EU (✓)

5.8.1 Existence of usage of a recognised and accessible grievance and dispute resolution mechanism for all stakeholders

ISCC-EU (✓)

4.1 A self-declaration on good social practice regarding human rights has been communicated to the employees and signed by the farm management and the employees' representative

The farm management and the employee's representative have signed and displayed a self-declaration assuring good social practice and human rights of all employees. The self-declaration must be in language appropriate to workers and surrounding communities. This declaration contains commitment to the ILO core labour standards, respect for living wage, respect for the social environment,

respect for legal land titles, sufficient compensation for communities, commitment to solve social conflicts, fair contract farming arrangements.

4.21 Mediation is available in case of a social conflict

An independent mediator should be assigned by name and address by the elected person of trust.

CI 34. Negotiations concerning compensation for loss of legal, customary or user rights are dealt with through a documented system that enables indigenous peoples, local communities and other stakeholders to express their views through their own representative institutions as free, prior and informed consent and negotiated agreements

RSB (~)

(Criterion 12b. Free, Prior, and Informed Consent shall form the basis for all negotiated agreements for any compensation, acquisition, or voluntary relinquishment of rights by land users or owners for biofuel operations)

SBP (✓)

1.2.1. The Biomass Producer has control systems and procedures to ensure that legality of ownership and land use can be demonstrated for the Supply Base.

Examples of Means of Verification:

- Existing legislation
- Level of enforcement
- Documents demonstrating that the Biomass Producer is a legally defined entity
- Documentation showing legal ownership patterns in the region, level of enforcement, records of disputes over land tenure, etc. In situations where customary rights govern use and access, these rights are clearly identifiable
- Long term unchallenged use.

Guidance: Where there are, or have been, disputes, evidence should be available that fair compensation has been made to previous owners and occupants, and that this has been accepted with Free, Prior and Informed Consent (FPIC).

RSPO RED (✓)

6.4. Any negotiations concerning compensation for loss of legal, customary or user rights are dealt with through a documented system that enables indigenous peoples, local

communities and other stakeholders to express their views through their own representative institutions.

7.6. Where it can be demonstrated that local peoples have legal, customary or user rights, they are compensated for any agreed land acquisitions and relinquishment of rights, subject to their free, prior and informed consent and negotiated agreements.

RTRS EU RED (✓)

3.2.1 In the case of disputed use rights, a comprehensive, participatory and documented community rights assessment is carried out.

3.2.2 Where rights have been relinquished by traditional land users there is documented evidence that the affected communities are compensated subject to their free, prior, informed and documented consent.

4.4.2. There is no conversion of land where there is an unresolved land use claim by traditional land users under litigation, without the agreement of both parties.

ISCC-EU (✓)

4.1 A self-declaration on good social practice regarding human rights has been communicated to the employees and signed by the farm management and the employees' representative.

The farm management and the employee's representative have signed and displayed a self-declaration assuring good social practice and human rights of all employees. The self-declaration must be in language appropriate to workers and surrounding communities. This declaration contains commitment to the ILO core labour standards, respect for living wage, respect for the social environment, respect for legal land titles, sufficient compensation for communities, commitment to solve social conflicts, fair contract farming arrangements

4.9 All impacts for surrounding areas, communities, users and land owners taken into account and sufficiently compensated for

A participatory social impact assessment has been conducted, where all relevant stakeholders including local communities and indigenous people have been engaged. The report is publicly available in appropriate language to surrounding communities. On the basis of that report an action plan to address identified social impacts and a continued dialogue with surrounding communities is in place.

Documents of regular meetings with communities (with two-way communication) and local government with listed risks and/or impacts and evidence of minuted negotiations or resolution processes are compiled.

CI 35. Fair Pricing and Transparent Contracts

RSPO RED (✓)

(Criterion 6.10. Growers and millers deal fairly and transparently with smallholders and other local businesses)

6.10.3 Evidence shall be available that all parties understand the contractual agreements they enter into, and that contracts are fair, legal and transparent.

RTRS EU RED (✓)

2.2.1 Workers (including temporary workers), sharecroppers, contractors and subcontractors have a written contract, in a language that they can understand.

2.2.2 Labour laws, union agreements or direct contracts of employment detailing payments and conditions of employment (e.g. working hours, deductions, overtime, sickness, holiday entitlement, maternity leave, reasons for dismissal, period of notice, etc.) are available in the languages understood by the workers or explained carefully to them by a manager or supervisor

Bonsucro EU (✓)

2.3.4 Payment for cane deliveries are made according to agreed contract. Notes: Payment shall be made according to contractual agreement (including value and timing of payment).

(2.4 To provide clear, equitable and comprehensive contracts)

2.4.1 Existence of a contract or equivalent document.

Greenergy (✓)

16.8.4 Where workers operate on the basis of piecework, the pay rates must allow wages consistent with 16.8.1 to be earned during normal working hours and allocated in a transparent way. Guidance: For cane delivered on a supply contract, payment is usually based on the weight and quality of the delivery.

ISCC-EU (✓)

Principle 4: Biomass production shall not violate human rights labour rights or land rights. It shall promote responsible labour conditions and workers' health, safety and welfare and shall be based on responsible community relations

4.22 Fair and transparent contract farming arrangements are in place

Essential indicators are:

(1) The contracts are on paper in the appropriate language and co-signed copies are available with both parties. In case of cooperative contract arrangements, all members have a copy.

(2) Payments for harvest are, in calculated form, done on paper and signed and handed over to contract farmer for his/her own record keeping.

(3) Provisions governing price-quality parameters are clearly defined in the contract.

(4) The contract contains clear provisions on exit arrangements, buy-out possibilities, handing over of property deeds (when appropriate), and compensation measures in case of bankruptcy of the mother company when legally required.

(5) There are minutes of meetings providing evidence of regular discussions or negotiations between Mother Company and contract farmers' representatives.

CI 36. Training and requalification of the workforce

GBEP (✓)

21. Training and re-qualification of the workforce.

(21.1) Share of trained workers in the bioenergy sector out of total bioenergy workforce, and

(21.2) share of re-qualified workers out of the total number of jobs lost in the bioenergy sector

RSB (GLOBAL) (✓)

5.a.i.7. The participating operator provides objective evidence demonstrating that skill-training programs that support the employment of permanent workers and of local workers are in place and implemented

SBP (✓)

2.3.2. Adequate training is provided for all personnel, including employees and contractors (CPET S6d).

RSPO RED (✓)

(Criterion 4.8. All staff, workers, smallholders and contract workers are appropriately trained)

4.8.1 (M) A formal training programme shall be in place that covers all aspects of the RSPO Principles and Criteria, and that includes regular assessments of training needs and documentation of the programme.

4.8.2 Records of training for each employee shall be maintained.

RTRS EU RED (✓)

2.2.3. Adequate and appropriate training and comprehensible instructions on fundamental rights at work, health and safety and any necessary guidance or supervision are provided to all workers.

3.4.2. There is collaboration with training programs for the local population.

Bonsucro EU (✓)

2.2.4. Percentage of staff trained for health and safety at start and at least every 5 years

5.1.1 Percentage of payroll dedicated for or time spent by direct employees in vocational training sessions

Greenergy (✓)

16.7.1. All workers receive regular and adequate health and safety training appropriate to the work that they perform.

1.6.7.3. Hazards are identified and workers informed and adopt preventive measures to minimise risks. Records of accidents are maintained

ISCC-EU (✓)

2.7.1 Assistance with implementation of IPM systems has been obtained through training or advice

The technically responsible person on the farm has received a formal and documented training and / or the assistance of an external technical IPM consultant with the required technical qualifications is ensured.

(PRINCIPLE 3: Safe working conditions through training and education, use of protective clothing and proper and timely assistance in the event of accidents).

CI 37. Value of the products (this includes the value and volume of production and/or the value added / ton).

RSB (GLOBAL) (✓)

(Criterion 6b. In food insecure regions, biofuel operations shall enhance the local food security of the directly affected stakeholders). Minimum requirements:

- In regions where food security is an ongoing risk and concern, operations shall enhance food security of the locally affected community by, for instance, setting aside land for food growing, increasing yields, providing opportunities for workers to carry out household-level food production, sponsoring agricultural support programs and activities, and/or making value-added food by-products available to the local market.

RSPO RED (✓)

5.3.3 A waste management and disposal plan to avoid or reduce pollution shall be documented and implemented. The waste management and disposal plan should include measures for:

- Improving the efficiency of resource utilisation and recycling potential wastes as nutrients or converting them into value-added products (e.g. through animal feeding programmes).

Bonsucro EU (✓)

5.9.1 Value added/ ton cane

GGL-Forest (✓)

4.2e Costs, productivity and efficiency of forest management.

CI 38. Means for research

Bonsucro EU (✓)

Research and extension costs as a % of sales

Annex 4. COMPLEMENTARY INDICATORS: not meaningfully reflected in the analysed schemes

4.1. Forest schemes

In Table 10 the benchmark and gap analysis of the selected Forest schemes against the identified Complementary indicators is shown. This Table shows the complementary indicators that were not meaningfully reflected in the analysed schemes but that may be of further interest in the project.

Table 10 *Benchmark and Gap Analysis of the selected Forest Schemes against the identified Complementary Indicators (not meaningfully reflected in the analysed schemes)*

S2Biom related Theme (T) or Criterion (C)	Topic	reference	Complementary indicator	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal
All	Governance	a	Commitment to a code of ethical conduct														
All	Governance	b	Due diligence														
Theme 2: Social	Food sovereignty	c	Food sovereignty														
T2: Social	Social well-being	d	Fair access to means of production														

S2Biom related Theme (T) or Criterion (C)	Topic	reference	Complementary indicator	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal
Theme 3: Economic	Economic	e	Internal Investment (*assumed that internal investment is a must to comply with the commitment to long-term economic viability)	✓		~		~									
Theme 3: Economic	Economic	f	Net cash flow														
Theme 3: Economic	Economic	g	Marketing of forest products				✓		✓								
C1- Resource efficiency	Best Practices for Resource Efficiency	h	Material consumption practices														
C1- Resource efficiency	Best Practices for Resource Efficiency	i	Renewable and recycled materials consumption														
C1- Resource efficiency	Best Practices for Resource Efficiency	j	(Reduction of) intensity of material use														
C3-Biodiversity (Theme 1: Environment)	Land Use and Land Use Change	k	Conversion of abandoned agricultural and treeless land into forest		✓												

S2Biom related Theme (T) or Criterion (C)	Topic	reference	Complementary indicator	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal
C3-Biodiversity (Theme 1: Environment)	Land Use and Land Use Change	l	Promote the use of fallow areas														
C3: Biodiversity (Theme 1: Environment)	Best Environmental Practices	m	Minimum separation of production areas from natural terrestrial ecosystems														
C3-Biodiversity (Theme 1: Environment)	Sustainable harvesting of forest products and non-wood forest products	n	Fallen dead wood, hollow trees, old groves and special rare tree species shall be left in quantities and distribution necessary	~	✓											✓	
Theme 1: Environment	Sustainable harvesting of forest products and non-wood forest products	o	Process of residue removal minimises harm to ecosystems.														
Theme 1: Environment	Locally adapted	p	Use of locally adapted varieties and breeds		✓												



S2Biom related Theme (T) or Criterion (C)	Topic	reference	Complementary indicator	FSC	PEFC	Tarapoto FMU	ITTO FMU	Tarapoto CL	ITTO CL	ASI	ATO	CILSS	SADC	Lepaterique	Near East Process	MCFPE	Montreal
	varieties and breeds																

CI e. Internal Investment (assumed that internal investment is a must to comply with the commitment to long-term economic viability)

FSC (✓)

5.5 The Organization shall demonstrate through its planning and expenditures proportionate to scale, intensity and risk, its commitment to long-term economic viability.

Tarapoto FMU (~)

11.2 Profitability and rate of return of forest management.

Tarapoto CL (~)

1.1 Indicators of Income, Production and Consumption

- Economic profitability of management and sustainable use of the forests.
- Sustainable production, consumption and extraction of forest products.
- Values of forest products from sustainable sources and from unsustainable sources as percentages of Gross National Product.
- Employment and direct and indirect income from sustainable activities in the forest sector and generation of forest-based employment in relation to total national employment.
- Average per capita income in different forest sector activities.
- Efficiency and competitiveness of forest product production and processing systems Impact of the economic use of forests on the availability of forest resources of importance to local populations.
- Relationship between direct and indirect uses of the forests.

CI g. Marketing of forest products

ITTO FMU (✓)

1.8. Existence of, and ability to apply, appropriate technology to practise forest management and the efficient utilization and marketing of forest products

ITTO CL (✓)

1.8. Existence of, and ability to apply, appropriate technology to practise forest management and the efficient utilization and marketing of forest products

CI k. Conversion of abandoned agricultural and treeless land into forest

PEFC (✓)

5.1.12 Conversion of abandoned agricultural and treeless land into forest land shall be taken into consideration, whenever it can add economic, ecological, social and/or cultural value.

CI n. Fallen dead wood, hollow trees, old groves and special rare tree species shall be left in quantities and distribution necessary

FSC (~)

6.3 The Organization shall identify and implement effective actions to prevent negative impacts of management activities on the environmental values, and to mitigate and repair those that occur, proportionate to the scale, intensity and risk of these impacts

PEFC (✓)

5.4.13 Standing and fallen dead wood, hollow trees, old groves and special rare tree species shall be left in quantities and distribution necessary to safeguard biological diversity, taking into account the potential effect on the health and stability of forests and on surrounding ecosystems.

MCFPE (✓)

4.5 Deadwood Volume of standing deadwood and of lying deadwood on forest and other wooded land classified by forest type

CI p. Use of locally adapted varieties and breeds

PEFC (✓)

5.4.5 For reforestation and afforestation, origins of native species and local provenances that are well-adapted to site conditions shall be preferred, where appropriate. Only those introduced species, provenances or varieties shall be

used whose impacts on the ecosystem and on the genetic integrity of native species and local provenances have been evaluated, and if negative impacts can be avoided or minimised. Note: CBD (Convention on Biological Diversity) Guiding Principles for the Prevention, Introduction, and Mitigation of Impacts of Alien Species that Threaten Ecosystems, Habitats or Species are recognised as guidance for avoidance of invasive species.

4.2. Agricultural schemes

In Table 11 the benchmark and gap analysis of the selected agricultural schemes against the identified Complementary indicators is shown. This Table shows the complementary indicators that were not meaningfully reflected in the analysed schemes but that may be of interest to consider in further studies.

Table 11 Benchmark and Gap Analysis of the selected Agriculture Schemes against the identified Complementary Indicators (not meaningfully reflected in the analysed schemes)

S2Biom related Theme (T) or Criterion (C)	Topic	reference	Complementary indicators	SAFA	SAN	RSPO	RTRS	Bonsucro	CAP
All	Governance	a	Commitment to a code of ethical conduct	✓		✓			
All	Governance	b	Due diligence	✓					
Theme 2: Social	Food sovereignty	c	Food sovereignty	✓					
T2: Social	Social wellbeing	d	Fair access to means of production	✓					
Theme 3: Economic	Economic	e	Internal investment (*assumed that internal investment is a must to comply with the commitment to long-term economic viability)	✓					
Theme 3: Economic	Economic	f	Net cash flow	✓					

S2Biom related Theme (T) or Criterion (C)	Topic	reference	Complementary indicators	SAFA	SAN	RSPO	RTRS	Bonsucro	CAP
Theme 3: Economic	Economic	g	Marketing of forest products						
C1- Resource efficiency	Best Practices for Resource Efficiency	h	Material consumption practices	✓					
C1- Resource efficiency	Best Practices for Resource Efficiency	i	Renewable and recycled materials consumption	✓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
C1- Resource efficiency	Best Practices for Resource Efficiency	j	(Reduction of) intensity of material use	✓	<input type="checkbox"/>				
C3-Biodiversity (Theme 1: Environment)	Land Use and Land Use Change	k	Conversion of abandoned agricultural and treeless land into forest	<input type="checkbox"/>					
C3-Biodiversity (Theme 1: Environment)	Land Use and Land Use Change	l	Promote the use of fallow areas	<input type="checkbox"/>	✓	<input type="checkbox"/>			
C3: Biodiversity (Theme 1: Environment)	Best Environmental Practices	m	Minimum separation of production areas from natural terrestrial ecosystems		✓				

S2Biom related Theme (T) or Criterion (C)	Topic	reference	Complementary indicators	SAFA	SAN	RSPO	RTRS	Bonsucro	CAP
C3-Biodiversity (Theme 1: Environment)	Sustainable harvesting of forest products and non-wood forest products	n	Fallen dead wood, hollow trees, old groves and special rare tree species shall be left in quantities and distribution necessary	<input type="checkbox"/>		<input type="checkbox"/>			
Theme 1: Environment	Sustainable harvesting of forest products and non-wood forest products	o	Process of residue removal minimises harm to ecosystems.	<input type="checkbox"/>		<input type="checkbox"/>			
Theme 1: Environment	Locally adapted varieties and breeds	p	Use of locally adapted varieties and breeds	<input checked="" type="checkbox"/>					

CI a. Commitment to a code of ethical conduct

SAFA (✓)

G 1.1.1. Mission Explicitness: Mission Explicitness is the highest level governance statement and should proclaim a commitment to sustainability. To achieve this, the enterprise will have made its commitment to all areas of sustainability clear to the public, to all personnel and other stakeholders through publishing a mission statement or other similar declaration (such as a code of conduct or vision statement) that is binding for management and employees.

RSPO (✓)

1.3.1 There shall be a written policy committing to a code of ethical conduct and integrity in all operations and transactions, which shall be documented and communicated to all levels of the workforce and operations.

CI b. Due Diligence

SAFA (✓)

G 1.2.1. Due Diligence

CI c. Food Sovereignty

SAFA (✓)

S 6.2.1. Food Sovereignty

CI d. Fair Access to Means of Production

SAFA (✓)

S 1.3.1. Fair Access to Means of Production

CI e. Internal Investment

SAFA (✓)

C 1.1.1. Internal Investment

CI f. Net cash flow

SAFA (✓)

C 2.4.1. Net cash flow

CI h. Material Consumption Practices.

SAFA (✓)

E 5.1.1: Material Consumption Practices

This indicator focuses on compiling all practices and activities that have been implemented that effectively: reduced the material intensity of the enterprise's operations; and replaced virgin non-renewable materials (including packaging, mulching, nets, greenhouse plastic, construction materials - excluding fuel) by recycled, reused and renewable ones (including wood) in the operation and replaced synthetic inputs by natural inputs.

CI i. Renewable and Recycled Materials consumption

SAFA (✓)

E 5.1.3: Renewable and Recycled Materials

Various materials that are of vital importance to the functioning of food value chains stem from non-renewable sources – for example metals, phosphorus fertilisers, fossil fuels. As many of these sources have to be considered as finite, reliance on them should be gradually reduced by reverting to renewable alternatives and recycled non-renewables. This indicator focuses on the degree of independence of the analysed enterprise from virgin non-renewable materials.

CI j. (Reduction of) intensity of Material Use.

SAFA (✓)

E 5.1.4: Intensity of Material Use

In addition to the replacement of virgin non-renewable by recycled and renewable materials, the material intensity of production – as a measure of eco-efficiency – should be reduced to, or kept at, a low level. This indicator pertains to the amount of materials used per unit of produce in the analysed enterprise' operations. This indicator measures the change in the quantity of materials used per unit produce in the operation (excluding fuel, machinery and food, including packaging and agrochemicals) during the past 5 years.

CI I. Promote the use of fallow areas

SAN (✓)

9.4. The farm must promote the use of fallow areas with natural or planted vegetation in order to recover natural fertility and interrupt pest life cycles. The farm must have a plan that indicates the fallow techniques or practices (planting, natural regeneration, etc.) and their timing. These areas must be identified in the fields and on the farm map. Burning is not allowed to prepare land

CI m. Minimum separation of production areas from natural terrestrial ecosystems

SAN (✓)

2.5. There must be a minimum separation of production areas from natural terrestrial ecosystems where chemical products are not used. A vegetated protection zone must be established by planting or by natural regeneration between different permanent or semi-permanent crop production areas or systems. The separation between production areas and ecosystems as defined in Annex 1 must be respected.

CI p. Locally adapted varieties and breeds

SAFA (✓)

E.4.3.3. Locally adapted varieties and breeds: For plants, this indicator measures the share of production accounted for by locally adapted varieties, and by rare and traditional (heirloom) varieties during the analysed timeframe. For animals, this indicator measures the share of production accounted for by locally adapted and/ or rare breeds during the analysed timeframe.

4.3. Bioenergy schemes

In Table 12 the benchmark and gap analysis of the selected Bioenergy schemes against the identified Complementary indicators is shown. This Table shows the complementary indicators that were not meaningfully reflected in the analysed schemes but that may be of interest to consider in further studies.

Table 12 Benchmark and Gap Analysis of the selected Bioenergy Schemes against the identified Complementary Indicators (not meaningfully reflected in the analysed schemes)

S2Biom related Theme (T) or Criterion (C)	Topic	reference	Complementary indicator	GBEP	RED	RSB (Global)	SBP	RSPO	RTRS	Bonsucro	Greenenergy	ISCC-EU	GGL-Agri	GGL-Forest
All	Governance	a	Commitment to a code of ethical conduct					✓						
All	Governance	b	Due diligence											
Theme 2: Social	Food sovereignty	c	Food sovereignty											
T2: Social	Social wellbeing	d	Fair access to means of production											
Theme 3: Economic	Economic	e	Internal Investment (*assumed that internal investment is a must to comply with the commitment to long-term economic viability)											
Theme 3: Economic	Economic	f	Net cash flow											

S2Biom related Theme (T) or Criterion (C)	Topic	reference	Complementary indicator	GBEP	RED	RSB (Global)	SBP	RSPO	RTRS	Bonsucro	Greenenergy	ISCC-EU	GGL-Agri	GGL-Forest
Theme 3: Economic	Economic	g	Marketing of forest products											
C1- Resource efficiency	Best Practices for Resource Efficiency	h	Material consumption practices											
C1- Resource efficiency	Best Practices for Resource Efficiency	i	Renewable and recycled materials consumption											
C1- Resource efficiency	Best Practices for Resource Efficiency	j	(Reduction) of Intensity of Material Use											
C3-Biodiversity (Theme 1: Environment)	Land Use and Land Use Change	k	Conversion of abandoned agricultural and treeless land into forest	~										
C3-Biodiversity (Theme 1: Environment)	Land Use and Land Use Change	l	Promote the use of fallow areas											
C3: Biodiversity (Theme 1: Environment)	Best Environmental Practices	m	Minimum separation of production areas from natural terrestrial ecosystems											

S2Biom related Theme (T) or Criterion (C)	Topic	reference	Complementary indicator	GBEP	RED	RSB (Global)	SBP	RSPO	RTRS	Bonsucro	Greenenergy	ISCC-EU	GGL-Agri	GGL-Forest
C3-Biodiversity (Theme 1: Environment)	Sustainable harvesting of forest products and non-wood forest products	n	Fallen dead wood, hollow trees, old groves and special rare tree species shall be left in quantities and distribution necessary											
Theme 1: Environment	Sustainable harvesting of forest products and non-wood forest products	o	Process of residue removal minimises harm to ecosystems.			✓	✓							
Theme 1: Environment	Locally adapted varieties and breeds	p	Use of locally adapted varieties and breeds											

CI a. Commitment to a code of ethical conduct

RSPO RED (✓)

1.3.1 There shall be a written policy committing to a code of ethical conduct and integrity in all operations and transactions, which shall be documented and communicated to all levels of the workforce and operations.

CI k. Conversion of abandoned agricultural and treeless land into forest

GBEP (~)

(8.4) Net annual rates of conversion between land-use types caused directly by bioenergy feedstock production, including the following (amongst others):

- arable land and permanent crops, permanent meadows and pastures, and managed forests
- natural forests and grasslands (including savannah, excluding natural permanent meadows and pastures), peatlands, and wetlands

CI o. Process of residue removal minimises harm to ecosystems

RSB (GLOBAL) (✓)

7.a.i.6. The participating operator provides objective evidence demonstrating that precautionary measures and implemented practices have been effective in maintaining or enhancing conservation values of global, regional or local importance.

Guidance for 7.a.i.6: The mitigation measures to be covered in the ESMP include but are not limited to sustainable harvesting of the biomass existing on the site (e.g. thinning, mowing), protection measures for biodiversity values, the creation of conservation set side zones, buffer zones, multiple use zones, controls on access and product removals, and specifically the ban on hunting, fishing, ensnaring, poisoning and exploitation of rare, threatened, endangered and legally protected species.

SBP (✓)

2.2.5. The BP has control systems and procedures for verifying that the process of residue removal minimises harm to ecosystems.

Annex 5. Non- benchmarked issues

5.1. Organic agriculture

With respect to organic agriculture, the International Federation of Organic Agriculture Movements (IFOAM) is an umbrella organization covering 815 affiliates (Members, Associates, and Supporters) in 120 countries¹. IFOAM (undated) indicates four principles of organic agriculture: health, ecology, fairness and care.

Many countries have developed specific regulations for organic agriculture and there are several voluntary certification schemes², but here we will focus on the provisions made at the EU level.

The EC regulation on organic production and labelling of organic products (EU 2007) establishes common objectives and principles to underpin the rules concerning:

- all stages of production, preparation and distribution of organic products and their control, and
- the use of indications referring to organic production in labelling and advertising.

This regulation refers to a list of different agricultural products but here particular emphasis will be paid to the production of live or unprocessed agricultural products. The regulation (EU 2007) states that organic production shall be based on the following principles:

- the appropriate design and management of biological processes based on ecological systems using natural resources which are internal to the system,
- the restriction of the use of external inputs,
- the strict limitation of the use of chemically synthesized inputs to exceptional cases, and
- the adaptation, where necessary, and within the framework of the regulation, of the rules of organic production taking account e.g. regional differences in climate and local conditions.

In addition to the overall principles set above, plant production within organic farming shall be based on the following specific principles:

¹ <http://www.ifoam.bio/en/news/2015/02/04/membership-directory-2015-now-available-dowLoad>

² http://en.wikipedia.org/wiki/Organic_certification

- the maintenance and enhancement of soil life and natural soil fertility, soil stability and soil biodiversity preventing and combating soil compaction and soil erosion, and the nourishing of plants primarily through the soil ecosystem,
- the minimisation of the use of non-renewable resources and off-farm inputs,
- the recycling of wastes and by-products of plant and animal origin as input in plant and livestock production,
- taking account of the local or regional ecological balance,
- the maintenance of plant health by preventative measures, such as the choice of appropriate species and varieties resistant to pests and diseases, appropriate crop rotations, mechanical and physical methods and the protection of natural enemies of pests, and
- the maintenance of the biodiversity of natural aquatic ecosystems, the continuing health of the aquatic environment and the quality of surrounding aquatic and terrestrial ecosystems in aquaculture production.

Moreover, the EU (2008) implementing regulation on organic farming, gives specific provisions for plant production with regards to:

- soil management and fertilization, including the use of fertilisers and soil conditioners, livestock manure and provisions with respect to plant-based preparations or preparations of microorganisms, and
- pest, disease and weed management: the products that can be used.