

2016

VERSION 4.2 DECEMBER 2016



**BONSUCRO PRODUCTION STANDARD
INCLUDING BONSUCRO EU PRODUCTION STANDARD**

ACKNOWLEDGEMENT

The Bonsucro Secretariat would like to express their gratitude to the participants of the Standard Revision Committee (SRC)* who have dedicated time, knowledge and passion to this two-year project. Without their guidance, advice and decisions, the Production Standard and Guidance would not have achieved the expected improvement and relevance to the sustainability hotspots within the sector. The Secretariat also thanks their companies who have allowed their employees to share their resources with Bonsucro.

The Secretariat also thanks the industrial members** who have accepted to receive the Bonsucro team and their chosen certification bodies to carry out the pilot audits. Their collaboration has ensured the revised Standard and Guidance are practical tools that can be implemented in the field.

The Secretariat would like to thank all the Bonsucro members and licensed certification bodies who have shared their experience and knowledge with the SRC and ensure the resulting Standard and Guidance are in line with the reality of the industry.

Finally the Secretariat would like to give a special thanks to Kate Brauman at the University of Minnesota, Institute on the Environment, who kindly dedicated a whole part of her research to the Bonsucro Standard and helped developed the new indicator 3.1.2.

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London 21st July 2014

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Bonsucro (trading name of Better Sugarcane Initiative Ltd.) is responsible for this document. The Guidance for the Bonsucro Production Standard is a living document and will be reviewed on an on-going basis for continued relevance and effectiveness.

Bonsucro Standards are reviewed at least every five years. The next review is scheduled for July 2019.

In compliance with EU RED, version 4.3 becomes effective from the date of its publication.

Bonsucro encourages its stakeholders to share their views regarding the Standards. Any comments on this document can be submitted to info@bonsucro.com and via the Bonsucro website: www.bonsucro.com.

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1. INTRODUCTION

BONSUCRO

Bonsucro is a global multi-stakeholder non-for-profit initiative dedicated to reducing the environmental and social impacts of sugarcane production while recognising the need for economic viability. The mission of Bonsucro is to achieve a sugarcane sector that is continuously improving and verified as sustainable by acting collaboratively within the sector and working to continuously improve the three pillars of sustainability: economic, social and environmental viability. Bonsucro aims to achieve this mission through providing the definition for sustainable sugarcane and all sugarcane derived products through a multi-stakeholder approach. Bonsucro also aims at ensuring the integrity of the implementation of the Bonsucro Production Standard, through the implementation of the Certification Protocol.

OBJECTIVE OF THE PRODUCTION STANDARD

The primary purpose of this document is to define a set of principles, criteria and indicators, along with explanatory notes, for the assessment of the performance of operators against the three pillars of sustainability. It is aimed at Bonsucro members who wish to achieve certification. It is also used by Licensed Certification Bodies and auditors when carrying out certification audits. Finally it is aimed at the wider audience of the sugarcane sector and any interested parties.

The document shall be read in conjunction with the Guidance for the Bonsucro Production Standard as this document contains additional requirements which implementation support compliance with the indicators of the Production Standard.

HISTORY OF THE DOCUMENT

Version 4.0

In June 2012, upon the recommendation of the Bonsucro Secretariat, the Board of Directors agreed to start the revision process of the Bonsucro Production Standard and Guidance. The Board instructed the Secretariat to follow the Standard Revision Procedure set up in line with the ISEAL Code of Best Practice for Standard Setting. The Secretariat called for the participation of Members, and one representative of each class of membership formed the Standard Revision Committee (SRC). The SRC first met in London in November 2012. The committee subsequently met remotely, and once in person in New Orleans in November 2013. The SRC was given the task to draft the new version of the Bonsucro Production Standard and Guidance. They based their work on six public and online consultations, six pilot audits and the involvement of several external consultants and technical experts. Each meeting was minuted and minutes were made public on the Bonsucro website.

A total of 6 public consultations to which 402 people participated were carried out during the project.

Nov 2012:	1 st consultation (London)
Jan 2013 – March 2013:	2 nd public consultation (online)
Nov 2013:	3 rd consultation (New Orleans)
Dec 2013 – Jan 2014:	4 th consultation (online)
Feb 2014:	5 th consultation (India)
June 2014:	6 th consultation (online)

A total of six pilot audits involving six Bonsucro Member mills and their supplying farms took place:

February 2014:	Brazil
March 2014:	India
April 2014:	Brazil
April 2014:	Australia (2)
May 2014:	Honduras

On 1st August 2014, the Bonsucro membership adopted the present standard.

REVISION ROUND	DATE	DESCRIPTION OF AMENDMENT
A	June 2010	Draft version sent to Bonsucro EU Sub Committee
B	July 2010	Final version approved by Bonsucro Management Committee
C	December 2010	Revision made based on compliance with EU RED
D	February 2011	Revision made based on compliance with EU RED
Draft version 2.0	November 2013	First draft open for public consultation

REVISION ROUND	DATE	DESCRIPTION OF AMENDMENT
Draft version 2.5	June 2014	Second Draft open for public consultation
Draft version 2.9	July 2014	Final draft published for vote by members
Version 4	July 2014	Revised Bonsucro Production Standard and Guidance with inclusion of new indicators and clarification added to the guidance document which became a guidance for implementation. 16 core indicators over 8 criteria 12 new indicators (added or replacing other indicators) 2 indicators which value were modified 2 indicators removed Removal of Principle 7 – Chain of Custody
Version 4.01	October 2014	Correction of errors shown in indicator 2.1.4 and HCV definition (English version only)
Version 4.1	August 2015	Revised Principle 6 to include certification for cellulosic ethanol produced from residues of sugarcane (e.g. sugarcane straw and bagasse) in the Bonsucro EU certification scope. Additional non-substantial changes made to indicators 5.2.4 and 2.3.4.
Version 4.1.2	May 2016	Draft revision in light of amendments to RED and FQD, as described in Directive 2015/1513
Version 4.2	August 2016	Revision in light of amendments to RED and FQD, as described in Directive 2015/1513
Version 4.2.1 Draft	September - December 2016	Revision in light of amendments to RED and FQD, as described in Directive 2015/1513

2. SCOPE

The Bonsucro Production Standard applies worldwide to any sugarcane mill and their supplying area wishing to sell sugarcane derived products as Bonsucro certified and make related claims. The Standard evaluates the outcome of practices implemented at mill and farm levels.

The Bonsucro Certification System makes a distinction between 2 certification options:

1. “Bonsucro”: compliant with Bonsucro requirements
2. “Bonsucro EU”: compliant with Bonsucro requirements PLUS additional requirements that are needed for EU RED compliance (in line with the EU Renewable Energy Directive (RED) 28/2009/EC – its similar provisions in the EU Fuel Quality Directive (FQD) 30/2009/EC and amendments included in Directive 2015/1513)

Within the Bonsucro Certification System documents (i.e. Standards, Guidance, and Certification Protocol) the extra Bonsucro EU requirements are clearly marked.

For certification against Bonsucro EU, the Bonsucro requirements PLUS all additional EU RED requirements must be met. Achieving Bonsucro EU certification is equivalent to achieving Bonsucro certification. Whereas the contrary does not apply; achieving Bonsucro certification is not equivalent to achieving Bonsucro EU certification.

In the context of a voluntary scheme, the Commission can recognise rules related to wastes and residues for the purposes of whether or not:

biofuels from a certain feedstock have to demonstrate compliance with the land use criteria (Article 17(1));

certain feedstocks can be considered to have zero GHG emissions to the point of collection (Annex V, Part C, 18).

3. REFERENCED PUBLICATIONS

Guidance to the Bonsucro Production Standard v4.2

Bonsucro Chain of Custody Standard v4.1

Bonsucro Certification Protocol v4.2

Bonsucro Calculator v4.1.1

ISEAL Code of Good Practice for Setting Social and Environmental Standards (Version 6.0 – December 2014)

ISO/IEC 17065:2012 – conformity assessment – Requirements for bodies certifying products, processes and services

ISO/IEC 17021:2011 – Conformity Assessment – Requirements for bodies providing audit and certification of management systems

PAS2050:2008 – Specification for the assessment of the life cycle greenhouse gas emissions of goods and services

EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources

EU Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009 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.

EU Directive 2015/1513 of the European Parliament and of the Council of 9 September 2015 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources.

4. DEFINITIONS AND ABBREVIATIONS

AGRICULTURE RESIDUES: In the context of sugarcane production, agriculture residues include any feedstock other than harvested cane, i.e. leaves, thrashes, tops, stumps, roots etc.

CONSENSUS: General agreement, characterized by the absence of sustained opposition to substantial issues by any important stakeholder group.

NOTE – Consensus should be the result of a process seeking to take into account the views of interested stakeholders, particularly those directly affected, and to reconcile any conflicting arguments. It need not imply unanimity. (Adapted from ISO/IEC Guide 2:2004)

FARM: Operator producing the sugarcane which is delivered to the mill.

MILL: Operator that applies for certification. The mill has the ultimate responsibility for compliance with the Bonsucro Standard.

OPERATOR: Farm or mill. Entities that are responsible for the undertaking and contracting activities related to the sugarcane growing and processing, including transportation.

PROCESSING RESIDUES: A processing residue is a substance that is not the end product(s) that a production process directly seeks to produce. It is not a primary aim of the production process and the process has not been deliberately modified to produce it. Examples of sugarcane processing residues include molasses, bagasse, lignin etc.

STAKEHOLDER: Individual or group that has an interest in any decision or activity of an organisation (from ISO 26000)

STANDARD: Document that provides, for common and repeated use, rules, guidelines or characteristics for products or related processes and production methods, with which compliance is not mandatory. (Adapted from Annex 1 of the WTO TBT Agreement)

Abbreviations:

EIMP: environmental impact and management plan

ESIA: environmental and social impact assessment

FPIC: Free Prior Informed Consent

GHG: greenhouse gas

HCV: high conservation value

LUC: land use change

PPE: personal protective equipment

For further definitions, see Annex 1.

5. FRAMEWORK FOR AUDITING

THE BONUCRO CERTIFICATION SYSTEM

The Bonsucro Certification System consists of 3 main elements:

1. **Standards:** Bonsucro has developed 2 standards:
 - The “**Bonsucro Production Standard**” contains principles and criteria for achieving sustainable production of sugarcane and all sugarcane derived products in respect of economic, social and environmental dimensions.
 - The “**Bonsucro Mass Balance Chain of Custody Standard**” contains a set of technical and administrative requirements for enabling the tracking of claims on the sustainable production of Bonsucro sugarcane and all sugarcane derived products along the entire supply chain from fields to mill including transportation; through to production (e.g. conversion, processing, manufacturing, transformation), to warehousing, transportation and trade, to the use of sugarcane and all sugarcane derived products.
2. **Guidance for implementation:** Bonsucro has developed guidance documents for members that provide further information on how to become compliant with the Bonsucro Production Standard and/or Chain of Custody Standard.
3. **Certification Protocol:** Bonsucro has developed a Certification Protocol for auditors that lists the process and procedures for certification against the Bonsucro Standards. This includes: 1.) rules and requirements for independent Certification Bodies to audit against the Bonsucro standards, and 2.) audit procedures for independent Certification Bodies to verify compliance with the Bonsucro Standards.

Together, these 3 elements form the Bonsucro Certification System. As such, these individual documents must always be used in relation to each other.

UNIT OF CERTIFICATION

- The certificate holder is the mill.
- The unit of certification is the mill and its cane supplying area and includes all relevant activities on the farms, mill site, including residue production and power export.
- The mill has the ultimate responsibility for compliance with the Bonsucro Standard of the operators included in the unit of certification to the effect that the whole operators included in the unit of certification shall be covered starting from its origin.

- The cane supply area included in the unit of certification comprises the farms/estates supplying cane in conformity with the Bonsucro and Bonsucro EU Standards. This may be 100% of the farms/estates supplying cane to the mill, or a lesser number. In the latter case only a respective percentage of the mill's production would be considered as Bonsucro or Bonsucro EU certified, in accordance with the principles set in the Bonsucro and Bonsucro EU Mass Balance Chain of Custody standards.
- The total area included in the unit of certification and used for cane production, not just the area harvested in the reporting period, is used in assessing the cane supply area.
- To guarantee that the sugarcane included in the unit of certification is actually processed by the mill, the mill must have a management system in place to ensure that the sugarcane processed at the mill is coming from a given field included in the unit of certification.
- If the mill is purchasing sugarcane, sugar or biofuel not produced within the unit of certification, it shall demonstrate that the sources of sugarcane, sugar or biofuel fulfil the requirements of the Bonsucro and Bonsucro EU Production Standards, by way of inclusion in the unit and scope of certification of a certified operator.

CERTIFICATION PROCESS

- Audits are conducted on the mill and on a sample of individual farms/estates in the cane supply area supplying cane to the mill as per the sampling methodology outlined in the Bonsucro Certification Protocol.
- In order to achieve certification with the Bonsucro Production Standard:
 - Full compliance with the 16 core indicators (plus Principle 6 for certification against Bonsucro EU) is required, plus
 - A minimum of 80 % of all the indicators must be satisfied. To be considered satisfied, an indicator which applies to mill and farm must be met by both entities.
- A mill that applies for certification against the Bonsucro Standard must also apply for certification against the Bonsucro Chain of Custody Standard. A certificate can only be issued when the mill is found compliant with both Standards. A mill can't be issued a Bonsucro Production Standard certificate without being in compliance with the Chain of Custody Standard.
- The result of the audit will be a volume of the Bonsucro certified sugarcane products based on a proportion of sugarcane supplied to the mill.

- The certification decision will be based on the result provided by the Bonsucro Calculator (see tab “output summary”). Data must be collected by growers and millers and verified during the audit process.
- The audit will be performed according to the frequency defined by Bonsucro in the Certification Protocol.
- The audit must be performed by Bonsucro Licensed Certification Bodies.

For more certification requirements see the Bonsucro Certification Protocol

6. BONSUCRO PRODUCTION STANDARD

PRINCIPLE 1- OBEY THE LAW

CRITERIA	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
1.1 To comply with applicable laws	1.1.1 National laws complied with	•	•	Yes/No	Yes	<p>CORE INDICATOR</p> <p>Relevant legislation refers to laws (including ratified and integrated international conventions), in line with the scope of application of the Bonsucro Production Standard. This includes laws on waste, pollution & environmental protection, nature conservation & HCV area protection, water quality & extraction, energy & GHG emission, labour conditions, operational health & safety, social wellbeing, land and water title and land and water -use rights, soil protection, agricultural and processing practices, transportation. The stricter regulation should prevail unless otherwise specified.</p> <p><i>For further information, see Guidance.</i></p>

CRITERIA	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
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	•	•	Yes/No	Yes	<p>CORE INDICATOR</p> <p>Those rights can be related either to legal ownership or lease of the land or to customary rights. Legal ownership shall be the official title in the country or equivalent (e.g. notary, government agency or other). Rights to water refer to the right to extract water, including cap on quantity extracted. Customary rights can be evidenced in other forms by a local statutory or customary body. Guidance for customary rights is provided in ILO Conventions 169 and 117. When land rights have been relinquished to the benefit of the operator, the operator shall demonstrate the decision was taken by Free Prior Informed Consent and negotiated.</p> <p>If conflicts arise, a negotiated resolution must be sought based on Free Prior Informed Consent (see also Criterion on participation and Criterion on Environmental and Social Impact Assessment 5.7).</p> <p><i>For further information, see Guidance.</i></p>
	1.2.2 Land that is legitimately contested by other users	•	•	Ha	0	<p>A legitimate contest is defined as a conflict that has been registered and accepted by a recognised justice system.</p> <p><i>For further information, see Guidance.</i></p>
	1.2.3 Water that is legitimately contested by other users	•	•	•	m ³	0

PRINCIPLE 2: RESPECT HUMAN RIGHTS AND LABOUR STANDARDS

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
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	•	•	Years	<p>18 for hazardous work</p> <p>15 (14) for non-hazardous work</p> <p>13 (12) for light family farm work</p>	<p style="text-align: center;">CORE INDICATOR</p> <p>Applies to all workers on the premises of the mill and farms included in the unit of certification.</p> <p>Definition of child labour based on Convention 138 and 182. The minimum age for admission to any type of employment or work which by its nature or the circumstances in which it is carried out is likely to jeopardise the health, safety or morals of young persons shall not be less than 18 years. Work by children on family small holdings is only acceptable under adult supervision and when work does not interfere with the child's schooling and does not put at risk his or her health.</p> <p>Note that special conditions set by ILO Convention C138 might apply.</p> <p>The operator shall implement a system to check worker's ages.</p> <p style="text-align: center;"><i>For further information, see Guidance.</i></p>
	2.1.2 Absence of forced or compulsory labour	•	•	Yes/No	Yes	<p style="text-align: center;">CORE INDICATOR</p> <p>Applies to all workers on the premises of the mill and farms included in the unit of certification.</p> <p>Forced or compulsory labour as defined per ILO Convention 29 and ILO Convention 105.</p> <p>Verification shall address all male and female permanent and contracted workers.</p> <p style="text-align: center;"><i>For further information, see Guidance.</i></p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
	2.1.3 Absence of discrimination	•	•	Yes/No	Yes	<p>CORE INDICATOR</p> <p>Applies to all workers on the premises of the mill and farms included in the unit of certification.</p> <p>Discrimination includes any distinction, exclusion or preference which has the effect of nullifying or impairing equality of opportunity or treatment as defined by ILO C111. Verification shall address all male and female permanent and contracted workers.</p> <p><i>For further information, see Guidance.</i></p>
	2.1.4 Respect the right of all workers to form and join trade unions and/or to bargain collectively	•	•	Yes/No	Yes	<p>CORE INDICATOR</p> <p>Applies to all workers on the premises of the mill and farms included in the unit of certification</p> <p>The operator shall respect such rights and shall not interfere with workers' own efforts to set up representational mechanisms in accordance with the law.</p> <p><i>For further information, see Guidance.</i></p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
2.2 To provide a safe and healthy working environment in work place operations	2.2.1 Lost time accident frequency	•	•	number per million hours worked	Mill <15; Agric < 45	<p>Applies to all workers on the premises of the mill and farms included in the unit of certification</p> <p>A lost time accident is defined as an unexpected and unplanned event which results in a personal injury which causes the worker to be unable to carry on with his/her normal duties on the next day or next shift. Where a fatal injury occurs, this to be noted separately.</p> <p><i>For further information, see Guidance.</i></p>
	2.2.2. Main health and safety risks are assessed and measures for mitigation of risk are implemented	•	•	Yes/No	Yes	<p>CORE INDICATOR</p> <p>Applies to all workers on the premises of the mill and farms included in the unit of certification.</p> <p>Assessment must be in agreement with national laws if existing. If not, the recommendations ILO Convention 184 provide guidance for the list of key potential areas of risks to assess.</p> <p>The operator shall design and implement measures to ensure that risks are eliminated, prevented or adequately mitigated.</p> <p>Risk = probability of exposure to a hazard x gravity of exposure to workers.</p> <p><i>For further information, see Guidance.</i></p>
	2.2.3. Appropriate personal protective equipment supplied to and used by all workers	•	•	•	Yes/No	Yes

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
	2.2.4 Percentage of staff trained for health and safety at start and at least every 5 years	•	•	%	>90	<p>Applies to all workers on the premises of the mill and farms included in the unit of certification.</p> <p>All workers (including migrant, seasonal and other contract labour) shall receive training in health and safety measures related to their operation.</p> <p>The operator shall ensure that all new employees receive basic instruction prior to formal training before commencing their tasks.</p> <p><i>For further information, see Guidance.</i></p>
	2.2.5 All workers present on the field and/or mill have access to drinking water in sufficient quantity	•	•	%	100	<p>CORE INDICATOR</p> <p>Applies to all workers on the premises of the mill and farms included in the unit of certification.</p> <p>The operator shall assess what sufficient quantity means in the local conditions.</p> <p>The operator shall ensure access to sufficient drinking water (especially under high temperature conditions), and safety of drinking water.</p> <p><i>For further information, see Guidance.</i></p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
	2.2.6 All workers present on the field and/or mill have access to first aid and provision for emergency response	•	•	Yes/No	Yes	<p>CORE INDICATOR</p> <p>Applies to all workers on the premises of the mill and farms included in the unit of certification.</p> <p>First aid supplies are available and checked, and dedicated personnel is trained to use them. Emergency response prevents the escalation of injury or illness and there shall be provision for injured or ill persons to receive professional medical treatment..</p> <p><i>For further information, see Guidance.</i></p>
	2.2.7 Working hours lost as percentage of total hours worked	•		%	< 5	<p>This represents working hours lost through absence also referred to as "no-show" as well as strikes, non-justified sickness etc... It does not include holiday, legal time off such as maternity leave, or training.</p> <p><i>For further information, see Guidance.</i></p>
2.3 To provide employees (including migrant, seasonal and other contract labour) with at least the applicable minimum wage	2.3.1 Ratio of lowest entry level wage including benefits to minimum wage and benefits required by law	•	•	/\$/\$	≥1	<p>CORE INDICATOR</p> <p>Applies to all workers on the premises of the mill and farms included in the unit of certification.</p> <p>Minimum wage as defined by legal requirement. In the absence of this, ILO C131 can serve as a basis for the definition. Workers paid at piece-rate shall receive the required minimum wage within working the number of normal legal hours of work. All benefits shall be paid. Pay slips shall be provided. Payment of wage shall be in in line with ILO 95 and 110 as detailed in the Guidance.</p> <p><i>For further information, see Guidance.</i></p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
	2.3.2 Maximum number of hours worked (normal and overtime)	•	•	Hrs/Hrs Or Hrs/week	< 1 Or 60	<p>Applies to all workers on the premises of the mill and farms included in the unit of certification.</p> <p>The operator shall ensure that workers do not work more hours than the level required by legislation.</p> <p>If there is no legal requirement framing maximum hours of work, maximum hours worked shall not exceed 60 hours per week.</p> <p><i>For further information, see Guidance.</i></p>
	2.3.3 Overtime is paid at a premium rate or equally compensated	•	•	%	>25	<p>Applies to all workers on the premises of the mill and farms included in the unit of certification.</p> <p>Overtime work (either defined internally if in line with national law or by national legislation) shall be voluntary. The total overtime hours shall not exceed the level set by national legislation.</p> <p><i>For further information, see Guidance.</i></p>
	2.3.4 Payment for cane deliveries are made according to agreed contract	•		Yes/No	Yes	<p>Payment shall be made according to contractual agreement (including value and timing of payment).</p> <p><i>For further information, see Guidance.</i></p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
2.4 To provide clear, equitable and comprehensive contracts	2.4.1 Existence of a contract or equivalent document	•	•	%	100	<p style="text-align: center;">CORE INDICATOR</p> <p>Applies to all workers on the premises of the mill and farms included in the unit of certification.</p> <p>All workers to be provided with a contract or equivalent document (e.g. national working card), to be explained their rights and obligations. If not specified by the law the contract shall include at least the following elements: hours of work, overtime payment, notice, rest periods, holidays, wages, mode of payment, and if legal, any deductions that will be made.</p> <p style="text-align: right;"><i>For further information, see Guidance.</i></p>

PRINCIPLE 3: MANAGE INPUT, PRODUCTION AND PROCESSING EFFICIENCIES TO ENHANCE SUSTAINABILITY

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
3.1 To monitor production and process efficiency; to measure the impacts of production and processing so that improvements are made over time	3.1.1 Total raw materials used per kg product	•		kg/kg	< 11 if no ethanol produced; <20 for full ethanol production	<p>Includes cane as major raw material as well as any other raw materials which comprise a mass >1% of the cane mass (including fuel and chemicals). Finished products include all products that are sold and which comprise a mass >1% of the mass of sugar and ethanol. Standard required varies between 2 limits depending on proportions of sugar and ethanol produced.</p> <p style="text-align: right;"><i>For further information, see Guidance.</i></p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
	3.1.2 Yield of production		•	Tc/ha	Depending on climatic zone	To maximise yield taking into account the climatic conditions where cane is grown. The yield shall not be annualised. Climatic zones are determined according to the GPS coordinates of the gathering mill. <i>For further information, see Guidance.</i>
	3.1.3 Mill overall time efficiency	•		%	>75	Processing time as a percentage of total crushing time. Any stoppage, including maintenance activities or power supply failure must be counted with the exception of stops due to rainfall exclusively. <i>For further information, see Guidance.</i>
	3.1.4 Factory Performance Index	•		%	>90	Used if sugar and no ethanol is produced (to the exception of ethanol produced from final molasses only). Ratio of actual sugar recovery to theoretical recovery of sugar from cane. In rare cases where high grade molasses is exported for fermentation, industrial efficiency can be used instead. <i>For further information, see Guidance.</i>
	3.1.5 Industrial Efficiency	•		%	>75	Used if ethanol only or sugar and ethanol (form anything other than final molasses) are produced in the same mill. It is the ratio of the sum of TSAI equivalent of products (sugar, ethanol, yeast, molasses) to the TSAI of the cane and imported molasses expressed as a %. <i>For further information, see Guidance.</i>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
3.2 To monitor global warming emissions with a view to minimising climate change impacts	3.2.1 Net GHG emissions per tonne of cane		•	Kg CO ₂ eq/t cane	<40	Estimates the emissions from agriculture activities. The result is also used in the calculation of the total emissions field-to-gate. <i>For further information, see Guidance.</i>
	3.2.2 Net GHG emissions per tonne of sugar	•	•	t CO ₂ eq/t sugar	Total <0.4	Only used if sugar is being produced. Field-to-gate emissions. Environmental Burden is t carbon dioxide equivalent. <i>For further information, see Guidance.</i>
	3.2.3 Net GHG emissions per MJ of ethanol	•	•	g CO ₂ eq/MJ fuel	Total <24	Used if ethanol is produced. Environmental Burden is g carbon dioxide equivalent. <i>For further information, see Guidance.</i>

PRINCIPLE 4: ACTIVELY MANAGE BIODIVERSITY AND ECOSYSTEM SERVICES

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
4.1 To assess impacts of sugarcane enterprises on biodiversity and ecosystems services	4.1.1 Dissolved oxygen in receiving stream	•		ppm	>2.5	Dissolved oxygen is an indicator of the quantity of oxygen available in the receiving stream to support life. Sampling should be carried after the discharging point where the flows mix and sub-surface at a point representative of the river flow. <i>For further information, see Guidance.</i>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
	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	•	•	%	0	<p>CORE INDICATOR</p> <p>To prevent the cultivation of sugarcane on areas of critical conservation value (including HCV categories 1-6) or area legally protected. International definitions of HCVs to take precedence over national where both exist. In the absence of HCV maps or databases, credible documentary evidence shall be provided to demonstrate that no HCV is converted after 1 Jan 2008.</p> <p><i>For further information, see Guidance.</i></p>
	4.1.3 The key environmental issues are covered by an appropriate and implemented environmental impact and management plan (EIMP)	•	•	%	>90	<p>CORE INDICATOR</p> <p>The EIMP addresses key environmental issues: biodiversity, ecosystem services, soil, water, air, climate change, use of crop protection chemicals, use of artificial fertilisers, cane burning and noise. The plan shall be implemented and progress monitored. A summary of the EIMP shall be made available to relevant stakeholders.</p> <p><i>For further information, see Guidance.</i></p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
	4.1.4 Ratio of fertiliser N and P applied (expressed in eq. phosphate) to fertilizer N and P recommended by soil or leaf analysis (expressed in eq. phosphate)		•		<1.05	Fertiliser applied according to soil or leaf analysis (N and P content). Recommendation shall be made according to local industry recognised best practices. <i>For further information, see Guidance.</i>
	4.1.5 Agro-chemicals applied per hectare per year		•	kg active ingredient/ha/y	<5	CORE INDICATOR To minimise air, soil and water contamination. Quantities of active ingredients of agro-chemicals (including pesticides, herbicides, insecticides, fungicides, nematocides, ripeners) applied. Also note the requirement to use only products registered for use and at registered rates. <i>For further information, see Guidance.</i>
	4.1.6 Banned agro-chemicals applied per hectare per year		•	kg active ingredient/ha/y	0	CORE INDICATOR Quantities of active ingredients of agro-chemicals listed in the Annex A of Stockholm and Annex 3 of Rotterdam conventions, Annexes A, B, C and E of Montreal protocol and WHO list Ia and Ib (see Annex 2). <i>For further information, see Guidance.</i>

PRINCIPLE 5: CONTINUOUSLY IMPROVE KEY AREAS OF THE BUSINESS

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
5.1 To train employees and other workers in all areas of their work and develop their general skills	5.1.1 Percentage of payroll dedicated for or time spent by direct employees in vocational training sessions	•	•	Day or %	>2 or >1	Total number of days spent by all employees whilst on training or total training expenses for all personnel, split between basic workers, intermediate management and upper management. <i>For further information, see Guidance.</i>
5.2 To continuously improve the status of soil and water resources	5.2.1 Net water consumed per unit mass of product	•	•	Kg of water/ kg of mass product	Farm < 130 Mill, <20 for sugar only or <30 for ethanol	Water used less water returned from mill to the environment. If effluents are exported by the mill to the fields for irrigation, the mill shall account for it as water returned to the environment. If vinasse or effluent is diluted before application on the fields, the farm shall account for the extracted dilution water as water consumed. <i>For further information, see Guidance.</i>
	5.2.2 For irrigated cane, efficient use of water		•	(kg/ha)/mm	>90	To ensure irrigated water is used efficiently. Relies on a direct measure of all waters applied to the fields (including extracted waters, recycled waters, diluted vinasse, diluted effluents). Only applies to full irrigation. <i>For further information, see Guidance.</i>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
	5.2.3 % Ground cover of tops or leaves after harvest		•	%	>30	To ensure the continuous improvement of soil organic carbon. <i>For further information, see Guidance.</i>
	5.2.4 Soil surface mechanically tilled per year (% of area under cane)		•	%	<20	To minimise the opportunity for erosion. Percentage of soil surface tilled per year. Only tillage deeper than 20 cm shall be taken into consideration. If any portion of the field has tillage, 100% of the field area would be considered as being tilled. <i>For further information, see Guidance.</i>
	5.2.5 Percentage fields with samples showing analyses within acceptable limits for pH		•	%	> 80	To ensure the maintenance an optimum soil pH. Sampling to be carried out at least once per crop cycle. Acceptable pH is between 5.0 and 8.0. <i>For further information, see Guidance.</i>
5.3 To continuously improve the quality of sugarcane and products from the sugar mill	5.3.1 Theoretical recoverable sugar content of cane	•	•	%	>10	Based on the theoretical recovery normalised for juice purity and cane fibre content. <i>For further information, see Guidance.</i>
	5.3.2 Fermentable total sugars content of cane, expressed as invert (TSAI)	•	•	kg/t cane	>120	Used if ethanol is produced, on its own or in conjunction with sugar production. Based on a 90.5 % utilisation of Total Sugars As Invert (TSAI). <i>For further information, see Guidance.</i>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
5.4 To promote energy efficiency	5.4.1 Total Net Primary Energy Usage per kg product	•		kJ/kg	Total <3000	Direct and indirect energy inputs. <i>For further information, see Guidance.</i>
	5.4.2 Energy used in cane transport per tonne cane transported	•		MJ/t cane	<50	Direct and indirect energy inputs. <i>For further information, see Guidance.</i>
	5.4.3 Primary energy use per tonne of sugarcane		•	MJ/t	<300	Direct and indirect energy inputs. <i>For further information, see Guidance.</i>
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	•	•	kg/t	Agriculture <0.15 Mill < 5	Environmental Burden is kg sulphur dioxide equivalent per tonne of cane (agriculture), sugar and ethanol (mill). <i>For further information, see Guidance.</i>
	5.5.2 Non-hazardous solid residues of production per tonne cane	•		t/t cane	< 1.0	Applies to the mill only. Residue of processing (compost, filter cake, soil/mud, boiler ash, bagasse, cane) and of agriculture (cane waste in fields after harvest, lost in transport). <i>For further information, see Guidance.</i>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
	5.5.3 Percentage of categories of non-production waste that are recycled	•	•	%	> 50	The operator shall have an active recycling programme for at least 50 % of the following categories: fibre, metal, plastic, oil and lubricants, batteries and chemical products. <i>For further information, see Guidance.</i>
5.6 To foster effective and focused research, development and extension expertise	5.6.1 Research and extension costs as a % of sales	•	•	%	>0.5	Includes levies to research institutes for research and extension. <i>For further information, see Guidance.</i>
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	•	•	%	100	CORE INDICATOR 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. <i>For further information, see Guidance.</i>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
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	•	•	Yes/No	Yes	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. <i>For further information, see Guidance.</i>
	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	•	•	%	>90	Ensure a process exists for identifying and inviting stakeholders to participate, communicating information, engaging with stakeholders and sharing relevant information publicly. Negotiated agreement shall be based on Free Prior Informed Consent. Evidence of negotiated agreements shall to be demonstrated. <i>For further information, see Guidance.</i>
5.9 To promote economic sustainability	5.9.1 Value added per tonne cane.	•	•	\$/t cane	Mill >4; agric >2	Value added by the operation is the value of sales less the price of goods, raw materials (including energy) and services purchased. <i>For further information, see Guidance.</i>

PRINCIPLE 6: ADDITIONAL MANDATORY REQUIREMENT FOR BIOFUELS UNDER THE EU RENEWABLE ENERGY DIRECTIVE (2009/28/EC), REVISED FUEL QUALITY DIRECTIVE (2009/30/EC) AND DIRECTIVE 2015/1513.

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
6.1 To monitor greenhouse gas emissions with the view of minimising impacts on climate change.	6.1.1 Global warming burden per unit of energy.	.	.	g CO ₂ eq/ MJ fuel (final biofuel) or g CO ₂ eq/ dry ton (raw material and intermediary products)	Final biofuel: Installations starting on or before 5 October 2015: <54.4 (until 31/12/2017) <41.9 (from 01/01/2018) Installations starting after 5 October 2015: <33.5 (from 01/01/2018 Raw material and intermediary products: No standard	CORE INDICATOR To calculate the greenhouse gas emissions from the production and use of sugarcane ethanol or cellulosic ethanol produced from agricultural residues of sugarcane (e.g. sugarcane straw and bagasse), the operator shall use either the default values provided in point D of the annex V of the EU Renewable Energy Directive (see annex 3) or calculate the actual greenhouse gas emissions. GHG emissions shall be reported using appropriate units. These are: a. g CO ₂ eq/dry-ton for raw materials and intermediary products b. g CO ₂ eq/MJ for final biofuels Use of a default value: The default value is the sum of the default value for cultivation: 14 g CO ₂ eq/MJ + the default value for processing (including excess electricity): 1 g CO ₂ eq/MJ + the default value for transport and distribution: 9 g CO ₂ eq/MJ. Emissions from the manufacture of machinery and equipment shall not be taken into account.

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
						<p>The operator must use this default value of 24 gCO₂eq/MJ* fuel if the annualized emissions associated with carbon stock changes caused by land use change after January 2008 are zero.</p> <p>If carbon stock changes due to land use change after January 2008 are not zero, greenhouse gas emissions resulting from changes in land carbon stocks must be added to the default values from the production and use of sugarcane ethanol. Emissions from carbon stocks changes must be calculated in accordance with Annex V, part C point 7. Of the EU legislation and the Commission Decision 2010/335/EU (OJ L151, 17/06/2010).</p> <p>When default values are used, information on GHG emissions should only be reported for final biofuels and can be reported as an aggregate. If relevant, both, the process technology and the raw material used need to be specified.</p> <p>Use of an actual value (See Annex 3 for detailed calculation):</p> <p>Actual values can only be calculated when all relevant information is available and transmitted through the chain of custody:</p> <p>a. Actual values of emissions from cultivation can only be determined at the origin of the chain of custody. Actual values of emissions from transport can only be determined if emissions of all transport steps are recorded and transmitted through the chain of custody.</p> <p>b. Actual values of emissions from processing can only be determined if emissions of all processing steps are recorded and transmitted through the chain of custody.</p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
						<p>Actual GHG values must be calculated according to the Annex V of the EU Renewable Energy Directive (2009/28/EC), Annex IV of the EU Fuel Quality Directive (2009/30/EC), Annex II of Directive 2015/1513 and EC Note BK/abd/ener.c.1(2015)4507918, using any EC-approved GHG calculation tool*. See also Annex 3 of this document for more details.</p> <p>Information on actual GHG emissions has to be provided for all relevant elements of the GHG emission calculation formula. Relevant refers in this context to elements for which reporting is obligatory (e.g. el in case of land use change), all elements for which actual values should be used instead of disaggregated default values and all elements related to emission savings (if applicable).</p> <p>If at any point of the chain of custody emissions have occurred and are not recorded, so that the calculation of an actual value is no longer feasible for operators downstream in the chain of custody, this must be clearly indicated in the delivery notes.</p> <p>Member States, or competent authorities of third countries, may submit to the Commission reports including data on typical emissions from cultivation of feedstock. The operator may apply these values as an alternative to actual values provided these have been published in the unit g CO₂eq/dry-ton of feedstock on the Commission website.</p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
						<p>For the purpose of actual GHG emission calculations, whenever available, the standard calculation values published on the Commission website shall be applied. In case alternative values are chosen this shall be duly justified and flagged up in the documentation of the calculations in order to facilitate the verification by auditors.</p> <p>At each step of the chain of custody it must be verified whether the emission estimate needs to be adjusted:</p> <ul style="list-style-type: none"> a. Additional emissions from transport and/or processing have to be added to ep and or etd respectively. b. Energy losses occurred during processing or if relevant transportation or storage have to be taken into account using a 'feedstock factor'. c. Whenever a processing step yields co-products, emissions need to be allocated using an 'allocation factor' following the rules set out in the GHG emission calculation methodology. d. At the last processing step the emission estimate needs to be converted into the unit g CO₂eq/MJ of final biofuel.

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
						<p style="text-align: center;">Minimum greenhouse gas savings:</p> <p>For installations starting operations after 5 October 2015:</p> <p>The greenhouse gas emission saving from the use of biofuels and bioliquids shall be at least 60 % less than the threshold established by the European Union legislation based on a Fossil Fuel Comparator (FFC) of 83.8 g CO₂eq/MJ**. Therefore, the global warming burden of compliant biofuel and bioliquids shall be less than 33.5 g CO₂eq/MJ.</p> <p>For installations having started operations on or before 5 October 2015:</p> <p>Until 31 December 2017, the greenhouse gas emission saving from the use of biofuels and bioliquids shall be at least 35 % less than the threshold established by the European Union legislation based on a Fossil Fuel Comparator (FFC) of 83.8 g CO₂eq/MJ**. Therefore, the global warming burden of compliant biofuel and bioliquids shall be less than 54.4 g CO₂eq/MJ until 31 December 2017. With effect from 1 January 2018, the greenhouse gas emission saving from the use of biofuels and bioliquids shall be at least 50 % (therefore less than 41.9 g CO₂eq/MJ).</p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
						<p>*As of May 2016, the Biograce GHG Calculator was approved for use in the European Union.</p> <p>http://www.biograce.net/content/ghgcalculationtools/recognisedtool/</p> <p>** Should the threshold, FCC value, or default values change as established by European Union Legislation, this will be reflected in the scheme with immediate effect.</p> <p>*** The term 'installation' includes any processing installation used in the sugarcane, sugar or ethanol production process. It shall not be understood as including production facilities that might have been intentionally added to the production chain only to qualify for the exemption foreseen in this provision.</p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
	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.		•	%	0	<p style="text-align: center;">CORE INDICATOR</p> <p>Land with high biodiversity value. Land that had one of the following statuses in or after January 2008, whether or not the land continues to have that status:</p> <p>(a) primary forest and other primary 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;</p> <p>(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;</p> <p>(c) highly biodiverse grassland that is: (i) natural 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 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.</p> <p>(d) new nature protection areas derived from a published European Commission decision. Bonsucro will communicate to economic operators any details of lists on protected areas as soon as they are available from the EC.</p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
						<p>Land with high carbon stock: Land that had one of the following statuses in January 2008 and no longer has that status:</p> <p>(a) wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year;</p> <p>(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 (It does not include land that is predominantly under urban or agricultural use, understood as tree stands in agricultural systems, such as fruit tree plantations and agroforestry systems when crops are grown under tree cover);</p> <p>(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 GHG emissions savings is calculated, it complies with the minimum threshold established in criterion 6.1 of the Bonsucro standard.</p> <p>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.</p> <p>*Regarding highly biodiverse grassland, the following criteria and definitions shall apply (EU Regulation 1307/2014):</p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
						<p>(1) 'Grassland' means terrestrial ecosystems dominated by herbaceous or shrub vegetation for at least 5 years continuously. It includes meadows or pasture that is cropped for hay but excludes land cultivated for other crop production and cropland lying temporarily fallow. It further excludes continuously forested areas as defined in Article 17(4)(b) of Directive 2009/28/EC unless these are agroforestry systems which include land-use systems where trees are managed together with crops or animal production systems in agricultural settings. The dominance of herbaceous or shrub vegetation means that their combined ground cover is larger than the canopy cover of trees;</p> <p>(2) 'Human intervention' means managed grazing, mowing, cutting, harvesting or burning;</p> <p>(3) 'natural highly biodiverse grassland' means grassland that: (a) would remain grassland in the absence of human intervention; and (b) maintains the natural species composition and ecological characteristics and processes;</p> <p>(4) 'non-natural highly biodiverse grassland' means grassland that: (a) would cease to be grassland in the absence of human intervention; and (b) is not degraded, that is to say it is not characterised by long-term loss of biodiversity due to for instance overgrazing, mechanical damage to the vegetation, soil erosion or loss of soil quality; and</p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
						<p>(c) is species-rich, that is to say it is:</p> <ul style="list-style-type: none"> (i) a habitat of significant importance to critically endangered, endangered or vulnerable species as classified by the International Union for the Conservation of Nature Red List of Threatened Species or other lists with a similar purpose for species or habitats laid down in national legislation or recognised by a competent national authority in the country of origin of the raw material; or (ii) a habitat of significant importance to endemic or restricted-range species; or (iii) a habitat of significant importance to intra-species genetic diversity; or (iv) a habitat of significant importance to globally significant concentrations of migratory species or congregatory species; or (v) a regionally or nationally significant or highly threatened or unique ecosystem. <p>The operators shall demonstrate that biofuel is not made from raw material obtained from land that in or after January 2008 was highly biodiverse grassland, unless in the case of non-natural highly biodiverse grasslands evidence is provided that the harvesting of the raw material is necessary to preserve its grassland status.</p>

CRITERION	INDICATOR	Processing & Milling	Agriculture	Verifier	Standard	NOTES
						<p>Highly biodiverse grasslands differ among climatic zones and may include, inter alia, heaths, pastures, meadows, savannahs, steppes, scrublands, tundra and prairies. These areas develop distinct characteristics for instance with regard to the degree of tree cover and the intensity of grazing and mowing.</p> <p>It is appropriate to consider degraded grassland as being impoverished in terms of biodiversity.</p>

7. ANNEXES

ANNEX 1 DEFINITIONS

		Reference
Company	The entirety of any organization or business entity responsible for implementing the standard.	SA 8000
Supplier/contractor	A business entity which provides the company with goods and/or services integral to, and utilized in/for, the production of the company's goods and/or services.	SA 8000
Subcontractor/sub-supplier	A business entity in the supply chain which, directly or indirectly, provides the suppliers with goods and/or services integral to, and utilized in/for, the production of the suppliers' and/or company's goods and/or services.	SA 8000
Agricultural Worker Categories	There is a lack of clear-cut distinctions between different categories of workers. Consequently, there are numerous types of labour relations and different forms of labour force participation. The different categories of workers also vary within each country and, in certain cases, a single farmer may be grouped in more than one category. Many smallholders supplement their income with wages earned by working in large commercial farms during harvesting periods.	
	Summary of broad categories of agricultural workers:	
	<p style="text-align: center;">NON WAGED</p> <p style="text-align: center;">Large and Middle Scale Farmers Small Scale Farmers Subsistence farmers Unpaid Family workers Collective farmers Tenants and Share croppers</p>	<p style="text-align: center;">WAGED</p> <p style="text-align: center;">Permanent Workers Temporary and Seasonal Workers Migrant Workers Subcontracted Workers Squatters Land-less workers</p>

		Reference
Child	Any person less than 15 years of age, unless local minimum age law stipulates a higher age for work or mandatory schooling, in which case the higher age would apply. If however, local minimum age law is set at 14 years of age in accordance with developing country exceptions under ILO convention 138, the lower age will apply.	ILO
	The ILO Minimum Age Convention, No. 138 (1973) states that the minimum age of employment should not be less than the age of completion of compulsory schooling and, in any case, shall not be less than 15 years. However a Member country, whose economy and educational facilities are insufficiently developed, may under certain conditions initially specify a minimum age of 14 years.	ILO
Child labour	Any work by a child younger than the age (s) specified in the above definition of a child, except as provided by ILO recommendation 146	ILO
Young worker	Any worker over the age of a child as defined above and under the age of 18.	ILO
Worst forms of child labour	Whilst child labour takes many different forms, a priority is to eliminate without delay the worst forms of child labour as defined by Article 3 of ILO Convention 182.	ILO
Hazardous child labour	Hazardous child labour is defined by Article 3 (d) of the ILO Convention concerning the Prohibition and Immediate Action for the elimination of the worst forms of child labour, 1999 (182) 3D work which, by its nature or its circumstances in which it is carried out is likely to harm the health, safety or morals of children.	ILO

		Reference
Occupational accident	An Occupational accident is an unexpected and unplanned occurrence, including acts of violence, arising out of or in connection with work which results in one or more workers incurring a personal injury, disease or death. Included in occupational accidents are travel, transport or road traffic accidents in which workers are injured and which arise out of or in the course of work, i.e. while engaged in an economic activity, or at work, or carrying on the business of the employer. Occupational injury: any personal injury, disease or death resulting from an occupational accident; an occupational injury is therefore distinct from an occupational disease, which is a disease contracted as a result of an exposure over a period of time to risk factors arising from work activity.	ILO Resolution/ Convention 155 on statistics of occupational injuries (resulting from occupational accidents), adopted by the Sixteenth International Conference of Labour Statisticians, (Oct.1998)
Occupational disease	A disease contracted as a result of an exposure to risk factors arising from work activity	ILO
Reporting period	This will be one year unless otherwise agreed. The period shall include a single complete milling season.	
Theoretical recovery of sugar	<p>The theoretical OR (Overall Recovery) normalized for juice purity and cane fibre content is calculated as:</p> $OR^* = E^* \cdot BHR^* = 0.98 \cdot \left[100 - \frac{20 \cdot W_{F,C}}{100 - W_{F,C}} \right] \cdot \left[1.5 - \frac{50}{P_J} \right]$ <p>where w_{F,C} is the fibre content of the cane in g/100 g and P_J the purity of the raw juice. In addition, refining all white sugar in a white end refinery is expected to increase the undetermined loss by 0.4 % of the sugar in raw juice. Then the factor 0.98 becomes 0.976.</p>	"Good Management Practices for the Cane Sugar Industry" by J Meyer et al.,p. 439.

		Reference
Phosphate equivalent as a measure of eutrophication	Since phosphorus and nitrogen differ in their eutrophication effects, a phosphate equivalent conversion is used based on potency factors of 3.06 for phosphorus and 0.42 for nitrogen. Using 120 kg N /ha/y and 20 kg P /ha/y, the figure would be $(120 \times 0.42) + (20 \times 3.06) = 112$ kg phosphate/ha/y.	IChemE (2002). Sustainable development progress metrics. Inst. Chem. Engrs. London.
High Conservation Value	High Conservation Values (HCVs) are biological, ecological, social or cultural values which are considered outstandingly significant or critically important, at the national, regional or global level. All natural habitats possess some inherent conservation values, including the presence of rare or endemic species, provision of ecosystem services, sacred sites, or resources harvested by local residents. However, some values are more significant or critical than others, and it is the HCV approach which offers an objective way of identifying those values to be maintained or enhanced. (see www.hcvnetwork.org). A cut off date of 1 January 2008 will apply.	
	The six High Conservation Values (HCVs):	
	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.	
	HCV 2 Landscape-level ecosystems and mosaics: Large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.	
	HCV 3 Ecosystems and habitats: Rare, threatened, or endangered ecosystems, habitats or refugia.	
	HCV 4 Ecosystem services: Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.	
	HCV 5 Community needs: Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc.), identified through engagement with these communities or indigenous peoples.	

		Reference
High Conservation Value	HCV 6 Cultural values: Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples.	
	Also includes soils with a large risk of significant soil-stored carbon such as peat lands, mangroves, wetlands and certain 100% native and natural grassland (that were never modified by human activities).	
Significantly affected	A significant impact would be apparent if the operations of sugarcane farms or mills resulted in changes to the environment that resulted in (1) the quality and / or quantity of habitat supporting an endangered or threatened species being affected to the extent that the numbers and viability of the species (the classification from the IUCN red list) was adversely affected; (2) conversion, diminution or degradation of the integrity of an endangered habitat such that there was a measurable adverse impact on its ecological status in the opinion of a competent ecologist (3) ecosystem service (such as water supply) being sufficiently changed as to cause material adverse impacts to local communities or ecosystems (for example, flows contain additional nutrients that change downstream ecology or affect the availability of drinking water for downstream communities).	
Conducting business with integrity	Businesses shall work against corruption in all its forms, including extortion and bribery.	Principle 10 UN Global Compact
Forced or compulsory labour	This shall mean all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily	ILO Convention C29
	Most common forms of forced or compulsory labour: Forced labour can take many forms – some imposed by the State, but the majority in the private economy. Forced labour can be an outcome of trafficking in persons and irregular migration. Mechanisms of force applied include debt bondage, slavery, misuse of customary practices and deceptive recruitment systems. Some of the most common forms of forced labour include (for a full list see ILO Handbook):	Combating forced labour: A handbook for employers and business, booklet 2

		Reference
Forced or compulsory labour	<ul style="list-style-type: none"> • Debt-induced forced labour: Commonly referred to as “bonded labour” in south Asia, where the practice is most common, but also known as “debt bondage”. .. Debt bondage arises when a person mortgages his or her services or those of his family members to someone providing credit in order to repay the loan or advance. 	
	<ul style="list-style-type: none"> • Forced labour as an outcome of human trafficking: Trafficking in persons, or human trafficking, is often linked to forced labour. It is fuelled by organised criminal networks or individuals and can involve deceptive recruitment, racketeering and blackmailing for the purpose of labour exploitation. 	
	<ul style="list-style-type: none"> • Forced labour linked to exploitation in labour contract systems: This can be found almost everywhere in the world today. For example, migrant workers can find themselves "bonded" to a labour contractor because excessive fees have been charged and with limited if any possibility to change the employer once they arrive in the destination country. 	
Discrimination	1 The term discrimination includes—(Art 1 C111)	ILO Convention C111
	(a) any distinction, exclusion or preference made on the basis of race, colour, sex, religion, political opinion, national extraction or social origin, which has the effect of nullifying or impairing equality of opportunity or treatment in employment or occupation;	
	(b) such other distinction, exclusion or preference which has the effect of nullifying or impairing equality of opportunity or treatment in employment or occupation as may be determined by the Member concerned after consultation with representative employers' and workers' organisations, where such exist, and with other appropriate bodies.	
	2. Any distinction, exclusion or preference in respect of a particular job based on the inherent requirements thereof shall not be deemed to be discrimination.	
	3. For the purpose of this Convention the terms employment and occupation include access to vocational training, access to employment and to particular occupations, and terms and conditions of employment.	
Symbols and Abbreviations	BOD biological oxygen demand	
	COD chemical oxygen demand	

		Reference
Symbols and Abbreviations	EMP environmental management plan	
	ESIA environmental and social impact assessment	
	g grams	
	GHG greenhouse gas	
	ha hectares	
	HCV high conservation value	
	kg kilograms	
	kJ kilojoules	
	kWh kilowatt hours	
	L litres	
	MJ megajoules	
	PPE personal protective equipment	
	RS reducing (invert) sugars	
	t metric tonnes	
	tc tonnes cane	
	TSAI total sugars expressed as invert	
y year		

ANNEX 2 – BANNED AGROCHEMICALS

Ingredient	International Regulation
CFCs	Montreal Protocol
Halons	Montreal Protocol
Other fully halogenated CFCs	Montreal Protocol
Carbon tetrachloride	Montreal Protocol
1,1,1-Trichloroethane (Methyl chloroform)	Montreal Protocol
Hydrochlorofluorocarbons	Montreal Protocol
Hydrobromofluorocarbons	Montreal Protocol
Methyl bromide	Montreal Protocol
Bromochloromethane	Montreal Protocol
2,4,5-T and its salts and esters	Rotterdam Convention
Aldrin	Rotterdam Convention
Binapacryl	Rotterdam Convention
Captafol	Rotterdam Convention
Chlordane	Rotterdam Convention
Chlordimeform	Rotterdam Convention
Chlorobenzilate	Rotterdam Convention
DDT	Rotterdam Convention
Dieldrin	Rotterdam Convention

Ingredient	International Regulation
Dinitro-ortho-cresol (DNOC) and its salts(such as ammonium salt, potassium salt and sodium salt)	Rotterdam Convention
Dinoseb and its salts and esters	Rotterdam Convention
1,2-dibromoethane(EDB)	Rotterdam Convention
Ethylene dichloride	Rotterdam Convention
Ethylene oxide	Rotterdam Convention
Fluoroacetamide	Rotterdam Convention
HCH (mixed isomers)	Rotterdam Convention
Heptachlor 76-44-8	Rotterdam Convention
Hexachlorobenzene	Rotterdam Convention
Lindane	Rotterdam Convention
Mercury compounds, including inorganic mercury compounds, alkyl mercury compounds and alkyloxyalkyl and aryl mercury compounds	Rotterdam Convention
Monocrotophos	Rotterdam Convention
Parathion	Rotterdam Convention
Pentachlorophenol and its salts and esters	Rotterdam Convention
Toxaphene	Rotterdam Convention

Ingredient	International Regulation
Dustable powder formulations containing a combination of: - Benomyl at or above 7 per cent, - Carbofuran at or above 10 per cent, - Thiram at or above 15 per cent	Rotterdam Convention
(1) Monocrotophos (Soluble liquid formulations of the substance that exceed 600 g active ingredient/l)	Rotterdam Convention
Methamidophos (Soluble liquid formulations of the substance that exceed 600 g active ingredient/l)	Rotterdam Convention
Phosphamidon (Soluble liquid formulations of the substance that exceed 1000 g active ingredient/l)	Rotterdam Convention
Methyl-parathion (emulsifiable concentrates (EC) at or above 19.5% active ingredient and dusts at or above 1.5% active ingredient)	Rotterdam Convention
(1) Parathion (all formulations – aerosols, dustable powder (DP), emulsifiable concentrate (EC), granules (GR) and wettable powders (WP) - of this substance are included, except capsule suspensions (CS))	Rotterdam Convention
Aldrin	Stockholm Annex A - prohibit
Alpa hexachlorocyclohexane	Stockholm Annex A - prohibit
Beta hexachlorocyclohexane*	Stockholm Annex A - prohibit
Chlordane	Stockholm Annex A - prohibit
Chlordecone*	Stockholm Annex A - prohibit
Dieldrin*	Stockholm Annex A - prohibit

Ingredient	International Regulation
Endrin	Stockholm Annex A - prohibit
Heptachlor	Stockholm Annex A - prohibit
Hexabromobiphenyl*	Stockholm Annex A - prohibit
Hexabromodiphenyl ether* and heptabromodiphenyl ether	Stockholm Annex A - prohibit
Hexachlorobenzene	Stockholm Annex A - prohibit
Lindane	Stockholm Annex A - prohibit
Mirex*	Stockholm Annex A - prohibit
Pentachlorobenzene	Stockholm Annex A - prohibit
Polychlorinated biphenyls (PCB)*	Stockholm Annex A - prohibit
Tetrabromodiphenyl ether* and pentabromodiphenyl ether*	Stockholm Annex A - prohibit
Toxaphene	Stockholm Annex A - prohibit
Polychlorinated biphenyls	Stockholm Annex A - prohibit
Technical endosulfan and its related isomers	Stockholm Annex A - prohibit
Aldicarb	WHO 1a
Brodifacoum	WHO 1a
Bromadiolone	WHO 1a
Bromethalin	WHO 1a
Calcium cyanide	WHO 1a

Ingredient	International Regulation
Captafol	WHO 1a
Chlorethoxyfos	WHO 1a
Chlormephos	WHO 1a
Chlorophacinone	WHO 1a
Difenacoum	WHO 1a
Difethialone	WHO 1a
Diphacinone	WHO 1a
Disulfoton	WHO 1a
EPN	WHO 1a
Ethoprophos	WHO 1a
Flocoumafen	WHO 1a
Hexachlorobenzene	WHO 1a
mercuric chloride	WHO 1a
Mevinphos	WHO 1a
Parathion	WHO 1a
Parathion-methyl	WHO 1a
Phenylmercury acetate	WHO 1a
Phorate	WHO 1a
Phosphamidon	WHO 1a
Sodium fluoroacetate	WHO 1a
Sulfotep	WHO 1a

Ingredient	International Regulation
Tebupirimfos	WHO 1a
Terbufos	WHO 1a
Acrolein	WHO 1b
Allyl alcohol	WHO 1b
Azinphos-ethyl	WHO 1b
Azinphos-methyl	WHO 1b
Blasticidin	WHO 1b
Butocarboxim	WHO 1b
Butoxycarboxim	WHO 1b
Cadusafos	WHO 1b
Calcium arsenate	WHO 1b
Carbofuran	WHO 1b
Chlorfenvinphos	WHO 1b
3-Chloro-1,2-propanediol	WHO 1b
Coumaphos	WHO 1b
Coumatetralyl	WHO 1b
Cyfluthrin	WHO 1b
Beta-cyfluthrin	WHO 1b
Zeta-cypermethrin	WHO 1b
Demeton-S-methyl	WHO 1b
Dichlorvos	WHO 1b

Ingredient	International Regulation
Dicrotophos	WHO 1b
Dinoterb	WHO 1b
DNOC	WHO 1b
Edifenphos	WHO 1b
Ethiofencarb	WHO 1b
Famphur	WHO 1b
Fenamiphos	WHO 1b
Flucythrinate	WHO 1b
Fluoroacetamide	WHO 1b
Formetanate	WHO 1b
Furathiocarb	WHO 1b
Heptenophos	WHO 1b
Isoxathion	WHO 1b
Lead arsenate	WHO 1b
Mecarbam	WHO 1b
Mercuric oxide	WHO 1b
Methamidophos	WHO 1b
Methidathion	WHO 1b
Methiocarb	WHO 1b
Methomyl	WHO 1b
Monocrotophos	WHO 1b

Ingredient	International Regulation
Nicotine	WHO 1b
Omethoate	WHO 1b
Oxamyl	WHO 1b
Oxydemeton-methyl	WHO 1b
Paris green	WHO 1b
Pentachlorophenol	WHO 1b
Propetamphos	WHO 1b
Sodium arsenite	WHO 1b
Sodium cyanide	WHO 1b
Strychnine	WHO 1b
Tefluthrin	WHO 1b
Thallium sulfate	WHO 1b
Thiofanox	WHO 1b
Thiometon	WHO 1b
Triazophos	WHO 1b
Vamidotion	WHO 1b
Warfarin	WHO 1b
Zinc phosphide	WHO 1b

ANNEX 3: DETAILED PARAMETERS TO CALCULATE GHG EMISSIONS FROM BIOFUELS SET UNDER THE EU RENEWABLE ENERGY DIRECTIVE (2009/28/EC), REVISED FUEL QUALITY DIRECTIVE (2009/30/EC) AND DIRECTIVE 2015/1513 AND INCLUDED IN PRINCIPLE 6.

Following Annex V of the Renewable Energy Directive, greenhouse gas emissions from the production and use of transport fuels, biofuels and bioliquids shall be calculated as:

$$E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{sca} - e_{ccs} - e_{ccr} - e_{ec}$$

where

E = total emissions from the use of the fuel;

e_{ec} = emissions from the extraction or cultivation of raw materials;

e_l = annualised emissions from carbon stock changes caused by land-use change;

e_p = emissions from processing;

e_{td} = emissions from transport and distribution;

e_u = emissions from the fuel in use;

e_{sca} = emission saving from soil carbon accumulation via improved agricultural management (NOT APPLICABLE);

e_{ccs} = emission saving from carbon capture and geological storage (NOT APPLICABLE);

e_{ccr} = emission saving from carbon capture and replacement (NOT APPLICABLE); and

e_{ec} = emission saving from excess electricity from cogeneration.

Emissions from the manufacture of machinery and equipment shall not be taken into account.

Actual values for emissions from cultivation (e_{ec})

Emissions from the extraction or cultivation of raw materials, e_{ec} , shall include emissions from the extraction or cultivation process itself; from the collection of raw materials; from waste and leakages; and from the production of chemicals or products used in extraction or cultivation. Capture of CO₂ in the cultivation of raw materials shall be excluded. Certified reductions of greenhouse gas emissions from flaring at oil production sites anywhere in the world shall be deducted. Estimates of emissions from cultivation may be derived from the use of averages calculated for smaller geographical areas than those used in the calculation of the default values, as an alternative to using actual values.

In case of emissions from cultivation, the use of average values for a region as an alternative to disaggregated default values or actual values is allowed. The Commission Communication 2010/C 160/02 lists the elements that need to be taken into account in the calculation, and provides guidance on the appropriate geographic coverage of the averages. Additionally, an annotated example of an actual calculation can be found on the Commission web site.

(1) Application of the bonus by the voluntary schemes will only be possible after the Commission has established definitions, including technical specifications required in this regard

Member States or competent authorities of third countries may submit to the Commission reports including data on typical emissions from cultivation of feedstock¹. As laid set out in Commission Communication 2010/C 160/02 the values from the “NUTS 2” reports, which were submitted to the Commission by the Member States as requested in Article 19(2) Renewable Energy Directive can be used by voluntary schemes. The calculation of these values has been scrutinised by the Commission services and thus voluntary schemes may allow operators to apply these values as an alternative to actual values provided these are available in the unit g CO₂eq/dry-ton of feedstock on the Commission web site. The calculation of alternative averages for areas and crops which are covered by the national authority NUTS 2 reports is not possible. Alternative averages may be calculated for areas at a more finegrained level than a NUTS 2 (or equivalent) level and restricted to farm groups only. In this context, it is important to note that at the values included in the NUTS 2 reports do not represent disaggregated default values. Therefore, they can at the time being only be used as an input for the calculation of actual values but cannot be used to report emissions from cultivation in the unit CO₂eq/MJ of biofuel.

Actual values for annualised emissions from carbon stock change (e₁)

(Please also see Annex 6 of Bonsucro Guidance for the Production Standard including Guidance for the Bonsucro EU Production Standard, which includes guidelines for the calculation of land carbon stocks as per EC 2010/335/EU).

“Annualised emissions from carbon stock changes caused by land-use change after 1 January 2008, e₁, shall be calculated by dividing total emissions equally over 20 years. Change from one crop to another is not regarded as land use change according to the Communication from the European Commission on the practical implementation of the EU biofuels and bioliquids sustainability scheme and on counting rules for biofuels (OJ C160/8 of 19 June 2010) and therefore annualized emissions (e₁) are equal to zero.

For the calculation of those emissions the following rule shall be applied

$$e_1 = (CS_R - CS_A) \times 3,664 \times 1/20 \times 1/P - e_B^2$$

where

(2) The quotient obtained by dividing the molecular weight of CO₂ (44,010 g/mol) by the molecular weight of carbon (12,011 g/mol) is equal to 3,664.

e_1 = annualised greenhouse gas emissions from carbon stock change due to land-use change (measured as mass (grams) of CO₂-equivalent per unit biofuel energy (megajoules));

CS_R = the carbon stock per unit area associated with the reference land use (measured as mass (tonnes) of carbon per unit area, including both soil and vegetation). The reference land use shall be the land use in January 2008 or 20 years before the raw material was obtained, whichever was the later (See Annex 6 in Guidance for the Bonsucro Production Standard);

CS_A = the carbon stock per unit area associated with the actual land use (measured as mass (tonnes) of carbon per unit area, including both soil and vegetation). In cases where the carbon stock accumulates over more than one year, the value attributed to CS_A shall be the estimated stock per unit area after 20 years or when the crop reaches maturity, whichever is the earlier (See Annex 6 in Guidance for the Bonsucro Production Standard);

P = the productivity of the crop (measured as biofuel or bioliquid energy per unit area per year) and

e_B = bonus of 29 gCO₂eq/MJ biofuel if biomass is obtained from restored degraded land, which shall be attributed if evidence is provided that the land:

- (a) was not in use for agriculture or any other activity in January 2008; and
- (b) falls into one of the following categories:
 - (i) severely degraded land, including such land that was formerly in agricultural use;
 - (ii) heavily contaminated land.

The bonus of 29 gCO₂eq/MJ shall apply for a period of up to 10 years from the date of conversion of the land to agricultural use, provided that a steady increase in carbon stocks as well as a sizable reduction in erosion phenomena for land falling under (i) are ensured and that soil contamination for land falling under (ii) is reduced.

The categories mentioned in point (b) above are defined as follows:

(a) 'severely degraded land' means land that, for a significant period of time, has either been significantly salinated or presented significantly low organic matter content and been severely eroded;

(b) 'heavily contaminated land' means land that is unfit for the cultivation of food and feed due to soil contamination. Such land shall include land that has been the subject of a Commission decision in accordance with the fourth subparagraph of Article 7c(3) of FQD (2009/30/EC).

Land carbon stocks are calculated according to the guidelines published by the European Commission, for land converted after 1 January 2008. These are outlined in the Commission Decision of 10 June 2010 on guidelines for the calculation of land carbon stocks for the purpose of Annex V of Directive 2009/28/EC, published in the EU Official Journal L151 of 17 June 2010, p. 19.

Bonsucro will communicate to economic operators any details of lists on protected areas as soon as they are available from the EC.

Actual values for emissions from processing (e_p)

Emissions from processing, e_p , shall include emissions from the processing itself; from waste and leakages; and from the production of chemicals or products used in processing.

In accounting for the consumption of electricity not produced within the fuel production plant, the greenhouse gas emission intensity of the production and distribution of that electricity shall be assumed to be equal to the average emission intensity of the production and distribution of electricity in a defined region. By derogation from this rule, producers may use an average value for an individual electricity production plant for electricity produced by that plant, if that plant is not connected to the electricity grid.

Actual values for emissions from transport and distribution (e_{td})

Emissions from transport and distribution, e_{td} , shall include emissions from the transport and storage of raw and semi-finished materials and from the storage and distribution of finished materials. Emissions from transport and distribution to be taken into account under point 6 shall not be covered by this point.

Actual values for emission saving from excess electricity from cogeneration (e_{ec})

Emission saving from excess electricity from cogeneration, e_{ec} , shall be taken into account in relation to the excess electricity produced by fuel production systems that use cogeneration except where the fuel used for the cogeneration is a co-product other than an agricultural crop residue. In accounting for that excess electricity, the size of the cogeneration unit shall be assumed to be the minimum necessary for the cogeneration unit to supply the heat that is needed to produce the fuel. The greenhouse gas emission saving associated with that excess electricity shall be taken to be equal to the amount of greenhouse gas that would be emitted when an equal amount of electricity was generated in a power plant using the same fuel as the cogeneration unit.

Adjustments throughout the chain of custody

Whenever actual values are calculated at each step of the chain of custody, the additional emissions from transport and/or processing need to be added to e_p and/or e_{td} , respectively.

Whenever a processing step yields co-products, emissions need to be allocated as set out in the GHG emission calculation methodology.

Put more formally, the following formula should be applied to emissions from cultivation when processing intermediate products:

$$\begin{aligned} e_{ec} \text{intermediate product}_a & \left[\frac{gCO_2eq}{kg_{dry}} \right] \\ & = e_{ec} \text{feedstock}_a \left[\frac{gCO_2eq}{kg_{dry}} \right] * \text{Feedstock factor}_a \\ & * \text{Allocation factor intermediate product}_a \end{aligned}$$

Where

$$\begin{aligned} \text{Allocation factor intermediate product}_a & = \left[\frac{\text{Energy in intermediate product}_a}{\text{Energy in intermediate product and co-products}} \right] \\ \text{Feedstock factor}_a & = [\text{Ratio of kg dry feedstock required to make 1 kg dry intermediate product}] \end{aligned}$$

At the last processing step, the emission estimate needs to be converted into the unit CO₂eq/MJ of final biofuel.

For this transformation, the following formula should be applied to emissions from cultivation:

$$\begin{aligned} e_{ec} \text{biofuel}_a & \left[\frac{gCO_2eq}{MJ \text{ biofuel}} \right]_{ec} \\ & = \frac{e_{ec} \text{feedstock}_a \left[\frac{gCO_2eq}{kg_{dry}} \right]}{LHV_a \left[\frac{MJ \text{ feedstock}}{kg \text{ dry feedstock}} \right]} \\ & * \text{Biofuel feedstock factor}_a * \text{Allocation factor biofuel}_a \end{aligned}$$

Where

$$\text{Allocation factor biofuel}_a = \left[\frac{\text{Energy in biofuel}}{\text{Energy biofuel} + \text{Energy in co-products}} \right]$$

$$\text{Biofuel feedstock factor}_a = [\text{Ratio of M} \text{ feedstock required to make 1 M} \text{ biofuel}]$$

(3) For the purposes of allocation only, the 'wet definition LHV' is used. This subtracts from the LHV of the dry matter, the energy needed to evaporate the water in the wet material. Products with a negative energy content are treated at this point as having zero energy, and no allocation is made. See also 2009/28/EC, Annex V, part C, point 18.

Similarly, also the values for e_p , e_{td} , e_l and e_{cc} need to be adjusted. As mentioned above in case of e_p and e_{td} , the emissions from the relevant processing step must be added.

For the purpose of this calculation feedstock factors based on plant data have to be applied. Please note that for the calculation of the feedstock factor the LHV values per dry ton need to be applied while for the calculation of the allocation factor LHV values for wet biomass³ need to be used.

Fossil fuel comparator and GHG savings

The fossil fuel comparator for the calculation of GHG reductions shall be 83.8 g CO₂eq/MJ. Should the Commission update the fossil fuel comparator then this will be updated in the Bonsucro scheme with immediate effect. Whenever actual values are used, each operator shall add GHG emissions from her/his operation to the actual GHG value included in the documentation attached to the consignment purchased from the previous operator in the supply chain. Bioethanol producers shall convert the total GHG emissions into gCO₂ eq/MJ of final biofuel and calculate the GHG savings compared to the fossil fuel comparator as follows:

$$\text{SAVING} = ((83.8 - \text{Emissions from criterion 6.1}) / 83.8) \times 100 \text{ per cent.}$$