RSB – ROUNDTABLE ON SUSTAINABLE BIOMATERIALS

RSB Soil Impact Assessment Guidelines

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Note on the use of this document

These guidelines help operators to conduct a soil impact assessment by evaluating potential impacts of operations on local soils.

They describe key aspects to be investigated during the planning of new projects or ongoing activities, in order to identify potential impacts operations may cause to soil health and, if relevant, good practices to minimise such impacts to an acceptable level.

These guidelines should be used primarily by RSB participating operators who trigger a soil impact assessment, as defined under Principle 8 of the RSB Principles & Criteria (RSB-STD-01-001). However, it is recommended that all RSB participating operators become acquainted with the issues described herein.

These guidelines may also be used by the auditor and other actors involved in the verification of compliance, in order to achieve a better understanding of key aspects to be considered during certification process.

Under no circumstances should this document serve as the basis for verification of compliance or audits of operators. No aspect of this document is normative.

1. Introduction

The purpose of these guidelines is to assist in the identification, assessment and mitigation of impacts that biofuel or biomaterial projects may have on soil health. The RSB principles are used as a point of departure, and a variety of references from the agro-industrial, biofuel and other sectors were used in the compilation of this guideline document.

2. Applying RSB principles to soil impact assessment

The following box includes Principle 8, with specific requirements:

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Principle 8: Operations implement practices that seek to reverse soil degradation and/or maintain soil health.

Criterion 8a: Operators shall implement practices to maintain or enhance the soil's physical, chemical, and biological condition.

Operators who must comply: Biomass producer

Minimum requirements

- Soil erosion shall be minimised through the design of the feedstock production site and use of sustainable practices in order to enhance the soil's physical health on a watershed scale.
- Operators shall implement practices to maintain or enhance the soil's organic matter on the feedstock production site.
- The use of agrarian and forestry residual products for feedstock production, including lignocellulosic material, shall not be at the expense of long-term soil stability and organic matter content.
- Operators shall implement practices to maintain and improve the soil's nutrient balance and reduce nitrate pollution.
- Operators shall implement practices to improve soil health such as conservation agriculture practices:
    - Direct seeding or planting: Involves growing crops without mechanical seedbed preparation and with minimal soil disturbance;
    - Maintenance of a permanent soil cover, by mulch or growing cover crops to protect the soil surface;
    - Diversifying and fitting crop rotations and associations in the case of annual crops and plant associations in the case of perennial crops.
- Where the screening exercise has triggered the need for a soil impact assessment (RSB-GUI-01-008-01), operators shall:
    - Develop a soil management plan as part of the Environmental and Social Management Plan (ESMP).
    - Perform periodic sampling of soil on the feedstock production site to evaluate the effect of the soil management plan on the organic matter content. Where the practices included in the soil management plan are not seen during monitoring to maintain the soil's organic matter at the optimal level, alternative practices shall be investigated.

3. Establishing baseline conditions

Before it is possible to assess the likely impacts of a proposed development on soil, it is essential to obtain reliable baseline information i.e. a 'snap shot' of the current state of soil resources within the project area prior to development. In addition to facilitating the identification and rating of significance of expected impacts, the baseline will also enable operators and stakeholders to determine whether the facility is having an impact on soil resources during the operational phase.

Considering the potentially high variability of the nature of soil at a small spatial scale, it is essential that the specialist gives careful consideration to the suite of parameters to be measured and the location of soil sample points. It is common practice for the developer to contract a specialist agronomist to undertake their own specialist study of soil types within the study area in order to determine the suitability for crops. These studies will provide information that is relevant to the establishment of a soil baseline study, with the main task then being the identification and assessment of impacts.

Table 1 provides guidance on the type of parameters that need to be considered during baseline monitoring of soil resources. Depending on the local context, certain of these parameters may be regarded as non-applicable and further parameters may be added on the advice of the soil resource specialist.

Table 1: Parameters to be considered in establishing baseline conditions for soil

Baseline grouping	Parameters
Nature of local soil resources	The location and physical description of soils based on: • National soil maps which differentiate soil units on the basis of geology, colour and texture. • Soil surveys, for complete morphological descriptions of the representative soils in the area.

Soil quality	• Soil organic matter
	• Physical conditions:
	  ○ Soil structure
	  ○ Depth of soil and rooting
	  ○ Infiltration and bulk density
	  ○ Water-holding capacity
	  ○ Percentage sand, silt and/or clay
	• Chemical conditions:
	  ○ pH
	  ○ Electrical conductivity
	  ○ Extractable nitrogen (N), phosphorus (P) and potassium (K)
	• Biological:
	  ○ Microbial biomass carbon (C) and N
	  ○ Potentially mineralisable N
	  ○ Soil respiration

Soil use	• Determine current agricultural potential/use of these soils. • The extent of use of the various soil types by local communities.

4. Identifying potential impacts to soil

An environmental impact is any change to the environment, whether adverse or beneficial, wholly or partially resulting from an operator's environmental issues or aspects. An environmental aspect is an element of an operator's activities, products or services that can interact with the environment (adapted from ISO 14.001).

There are a number of potential impacts to soils associated with biofuel/biomaterial developments. Although these have been incorporated into the RSB principles (see above), for the purpose of this guideline it is necessary to list the most common impacts. A list of key impacts to soil resources and sources of the impacts is provided in Table 2. It should be noted that it is necessary to consider both the direct impacts associated with the proposed development as well as potential cumulative impacts. While the direct impacts may be of low significance, their significance might be elevated when considered in the broader context.

Table 2: Examples of potential direct impacts to soil resources associated with biofuel or biomaterials developments

Aspect	Impacts
Land clearing and land preparation/transformation	• Loss of top soil • Soil erosion
Application of fertilizers	• Nutrient balance (N-P-K levels and soil pH)
Management and disposal of solid co-products and wastes	• Soil contamination
Management of the soil	• Soil degradation
Use of agricultural residues	• Soil erosion • Decrease of soil's organic matter and organic carbon • Nutrient balance (N-P-K levels and soil pH) • Soil compaction

5. Assessing the significance of key issues

The general approach to the identification and assessment of impacts as outlined in the RSB Impact Assessment Guidelines (RSB-GUI-01-002-01) must be adopted. The assessment of the impacts should be specific rather than general, and must apply the impact significance rating scale adopted for the Impact Assessment. The impact rating scale used must be the same as the one used by all the other specialists. The impacts of the construction and operational stages of the proposed project need to be identified and assessed, as do the impacts of the project alternatives. The significance of the impacts also needs to be rated for the 'before' and 'after' mitigation

scenarios. The following should be considered:

- It is important to seek input from local communities and experts who may have extensive knowledge of local baseline conditions.
- The impact assessment practitioner must ensure that the specialist(s) are appropriately experienced and sufficiently knowledgeable about local conditions, the proposed development, and assessment techniques to provide an accurate and defendable assessment of the potential impacts to soil resources.

6. Mitigating and monitoring

Mitigation measures

- Should address key issues;
- Should be practical and appropriate to the context of the operations;
- Will depend on the specific negative impacts and they must be effective;
- The management of fertilizer application (both type and rate) should be considered.

Monitoring

- Monitoring locations and frequency should be selected with the objective of providing representative soil monitoring data;
- Parameters selected for monitoring should be indicative of the potential impacts or pollutants of concern from the proposed development as well as the soil quality, particularly organic matter requirements necessary to maintain soil health;
- Parameters selected for monitoring should also include parameters that are regulated under compliance requirements;
- Monitoring programmes should apply internationally approved methods for sample collection, preservation and analysis;
- Analysis should be conducted by entities permitted or certified for this purpose;
- Sampling and analysis quality assurance / quality control plans should be prepared and implemented;
- The monitoring programme should also incorporate mechanisms to assess potential non-compliance or infringement on soil use by local communities within and surrounding the project area.

7. Structuring the contents of the soil management plan

The soil management plan required under Criterion 8a has to be integrated into the general ESMP (see Principle 2). Recommendations regarding the general structure of specialist reports are provided in the RSB Impact Assessment Guidelines (RSB-GUI-01-002-01). More specific guidelines for the specialist report on soil are provided below:

#	Section title	Contents
1	Summary	This should provide a summary of the specialist study including the impacts, conclusions and recommendations.
2	Introduction	The introduction should provide brief background information, the terms of reference for the study, and the study team.

3	Project description	An overview of the proposed development, including details of the agricultural, industrial and auxiliary components. This section should also provide a list of all aspects of the development requiring the use of soil, and total land agricultural area required.
4	Methodology	This section should indicate what data sources and research methods were used, as well as the methods employed during the gathering of data. Assessment of impacts should be explained in detail and should conform to internationally accepted methods.
5	Description of the environment	This section should provide an in-depth description of the regional and local existing soil use within the project area or which may be impacted negatively by the proposed development.
6	Legislative and policy review	An overview of the legislative framework, including applicable international agreement and conventions, national acts, and sub-national laws and regulations, that is of relevance to the management and conservation of soil resources. In addition, the relevance of specific legislation to the proposed project should be highlighted.
7	Impact assessment and mitigation measures	This section should form the bulk of the report. It should identify and assess each of the individual impacts and use the impact ratings method to rate their significance before and after mitigation, as well as during the construction, operation and decommissioning phases of the project. For each impact, the recommended mitigation measures needed in order to reduce the negative impacts and enhance the positive impacts associated with the proposed development should be discussed. Attention should be drawn to any very high or irreversible impacts that cannot be mitigated, as these may be fatal flaws that prevent the project from going ahead, and detailed justification for such a significance rating will need to be provided.
8	Monitoring recommendations	This section should identify the key indicators that should be monitored over time and the methods that should be employed to monitor them.
9	Conclusion	This should provide a summary of the context and impacts.
10	Recommendations	The recommendations should focus on the suggested mitigation measures.
11	References	A list of all the references and sources used during preparation of the specialist report.
12	Appendices	Appendices to the specialist report should include all relevant documents including but not limited to: o Any checklists, data sheets or questionnaires used during the baseline assessment o Details of analytical techniques and methodologies for preparation of samples o Any questionnaires used during the baseline assessment o Proof of certification for the analytical laboratory

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