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## **RSB Soil Impact Assessment Guidelines**

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## Note on the use of this document

These guidelines help the operator to conduct a Soil Impact Assessment by evaluating potential impacts of operations on local soils.

They describe key aspects to be investigated during planning of new projects or ongoing activities, in order to identify potential impacts biofuel operations may cause to water resources and, if relevant, good practices to minimize such impacts down to an acceptable level.

These guidelines should be used in priority by RSB participating operators that 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 get acquainted with the issues described herein.

These guidelines may equally be used by the auditor and other actors involved in the verification of compliance, in order to get 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 and audits of operators. No aspect of this document is normative.

These guidelines were developed in collaboration with:

**Coastal & Environmental Services**

[www.cesnet.co.za](http://www.cesnet.co.za)

## 1. Introduction

As is the case with the majority of agro-industrial developments, there is potential for impacts on soil largely resulting from soil erosion and the application of fertilizers to maximize crop yields. The purpose of this guideline is to assist in the identification, assessment and mitigation of these impacts. 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.

Note that Annex I describes a Rapid Assessment, which can be used in combination with RSB-GUI-01-002-04 in order to conduct a Rapid Environmental and Social Assessment (RESA).

## 2. RSB Principles applicable to soil impact assessment

The following box includes Principle and Criterion 8, with specific requirements:

**Principle 8: Biofuel operations shall implement practices that seek to reverse soil degradation and/or maintain soil health.**

**Criterion 8.a Operators shall implement practices to maintain or enhance soil physical, chemical, and biological conditions.**

**Operators who must comply:** Feedstock Producer

**8.a.1 Minimum requirements**

- *Soil erosion shall be minimized through the design of the feedstock production site and use of sustainable practices in order to enhance soil physical health on a watershed scale.*
- *Participating Operators shall implement practices to maintain or enhance soil 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.*

*Where the screening exercise has triggered the need for a Soil Impact Assessment (RSB-GUI-01-008-01), Participating 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 soil organic matter at the optimal level, alternative practices shall be investigated.*

**8.a.2 Progress requirements**

- *Participating Operators shall implement measures to improve soil health, such as Conservation Agriculture practices as defined by the FAO including*
  - Organic direct planting,*
  - Permanent soil cover,*
  - Crop rotation, or*
  - Fallow areas with natural or planted vegetation in order to recover natural fertility and interrupt pest life cycles.*

### 3. Establishment of baseline conditions

Before it is possible to assess the likely impacts of a proposed biofuel 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 the development. In addition to facilitating the identification and the 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 highly variable 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 for the ESIA, and can then be used as the baseline information for the ESIA, with the main task then been 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:** Parameter to be considered for establishment of a baseline for soil

Baseline grouping	Parameters
<b><i>Nature of local soil resources</i></b>	<ul style="list-style-type: none"> <li>• The location and physical description of soils based on:-               <ul style="list-style-type: none"> <li>○ National Soil Maps which differentiate soil units on the basis of geology, colour and texture</li> <li>○ Soil surveys – for complete morphological descriptions of the representative soils in the area.</li> </ul> </li> </ul>
<b><i>Soil Quality</i></b>	<ul style="list-style-type: none"> <li>• General soil properties               <ul style="list-style-type: none"> <li>○ Texture</li> <li>○ pH (H<sub>2</sub>O)</li> <li>○ pH (KCl)</li> <li>○ Cation Exchange Capacity (CEC), calcium, magnesium, Potassium, Phosphorus</li> <li>○ Total and available phosphorus and potassium</li> <li>○ Electrical Conductivity</li> <li>○ Organic Matter</li> <li>○ H + Al</li> <li>○ Percentage sand, silt and/or clay</li> </ul> </li> </ul>
<b><i>Soil Use</i></b>	<ul style="list-style-type: none"> <li>• Determine current agricultural potential/use of these soils.</li> <li>• The extent of use of the various soil types by local communities</li> </ul>

### 4. Potential impacts to soil associated with biofuel developments

There are a number of potential impacts to soils associated with biofuel developments. Although these have been incorporated into the RSB principles (see Boxes 1 – 4), 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:** Potential direct impacts to soil resources associated with biofuel developments

Issue	Impacts
Land clearing and preparation/transformation	<ul style="list-style-type: none"><li>• Loss of top soil</li><li>• Soil erosion</li></ul>
Application of fertilizers	<ul style="list-style-type: none"><li>• Change to soil's physical, chemical and biological properties</li></ul>
Management and disposal of solid co-products and wastes	<ul style="list-style-type: none"><li>• Soil contamination</li></ul>
Management of soil	<ul style="list-style-type: none"><li>• Soil degradation</li></ul>

## 5. Assessment of the significance of key issues

The general approach to the identification and assessment of impacts as outlined in the ESIA guidelines must be adopted. The discussion of the impacts should be specific rather than general and must apply the impact significance rating scale adopted for the ESIA. The impact rating scale used must be the same as that 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 other I&APs who may have extensive knowledge of local baseline conditions;
- The IA 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 defensible assessment of the potential impacts to soil resources;

## 6. Mitigation and monitoring

### *Mitigation measures:*

- Should address key issues;
- Should be practical and appropriate to the context of the biofuel development;
- Will depend on the specific 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. Contents of 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 ESMP Guidelines (RSB-GUI-01-002-05). More specific guidelines for the soil specialist report 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 and 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 discuss 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, operational 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 and 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	Recommendation	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: <ul style="list-style-type: none"> <li>○ Any checklists, data sheets or questionnaires used during the baseline assessment</li> <li>○ Details of analytical techniques and methodologies for preparation of samples</li> <li>○ Any questionnaires used during the baseline assessment</li> <li>○ Proof of certification for the analytical laboratory</li> </ul>

## 8. Bibliography

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## ANNEX I: Issues and impacts to be considered during a Rapid Assessment

As discussed in the general guideline document, under certain circumstances it may be appropriate to conduct a rapid assessment rather than a full EIA. Under such circumstances, the level of detail required is normally limited. Key issues related to soil resources that should be considered are listed in the checklist below (Table 3). If the answer to any of the screening questions in Table 3 is “Yes” then it is recommended that a specialist soil quality study be undertaken prior to approval of the project.

**Table 3:** Key questions to assess the significance of impacts to soil resources during a Rapid Assessment

Key Questions	Yes	No
1. Is the proposed project sited close to sensitive soil types (e.g. highly erodable soils)?		
2. Will the proposed development result in the release of untreated effluent, including sewage, into the soils?		
3. Is the proposed development likely to result in a measurable decrease in the quality of soil resources?		
4. Is the proposed development likely to result in the erosion of soil resources?		
5. Is the proposed development likely to result in a measurable decrease in the quantity of soil resources available to other users?		
6. Is the proposed development likely to result in transgression of international agreements or national or sub-national legislative requirements?		
7. Is the proposed development likely to impinge upon the formal or customary soil use rights of others?		
8. Is the proposed development likely to highly alter the quality of soil which will then impact on the type of crops that can be grown on that land in the future?		