

DNV GL ASSURANCE STATEMENT

BASF AGBALANCE V2.0

1 SCOPE OF WORK

Germanischer Lloyd Industrial Services GmbH (hereafter “DNV GL”) has carried out an independent validation and verification of BASF SE AgBalance® v2.0 Model (hereafter “AgBalance” or “Model”). The review of logic and consistency comprised all documents of the AgBalance® Model (see Chapter 4), from the inclusion of input values to the determination of generic results from the Model for processing in the so called AgBalance applications.

The Model is the heart of the AgBalance® Framework developed by BASF. BASF defined three parameters with the specification that the AgBalance® Model must always meet these parameters. Scope of this assessment was to ensure that the AgBalance® Model and its related documentation show compliance with the following parameters, as stated in the applicable documentation:

Adequacy: Whether the validated and LCA based AgBalance® Model fulfils the purpose to address sustainability related questions in agriculture by performing the sustainability analysis of farming practices within a defined goal and scope.

Robustness and reliability: Whether results are trustworthy and highly resistant to errors. Reliable input data and the validated AgBalance® Model are used for the sustainability analysis.

Transparency: The goal and scope of the sustainability analysis of farming practices, relevant input data used, and applied methodologies are comprehensively documented. Non-confidential data are accessible for the target audience on request to the Project Leader.

BASF provided DNV GL with the framework and model documents as well as an internal case study, to demonstrate the implementation of the model into one of its applications.

The complete list of documents that formed the basis for the validation can be found in chapter 4 of this document.

2 STATEMENT OF ASSURANCE

Based on the reviewed documents shown in Chapter 4 and the understanding that the improvements shown in Chapter 3 shall be included in all future projects and in the next revisions of the Model,

DNV GL states that

BASF’s AgBalance® v2.0 Model follows a logical and consistent process and meets the requirements of Adequacy, Robustness and Reliability, and Transparency.

3 IMPROVEMENTS

During the assessment, DNV GL highlighted some potential improvements, which should be considered in all future projects and in the next revisions of the Model.

1. A revision log has been initiated for all analysed documents. All further documents should also have a revision log, providing e.g. contents of change, date of change and person in charge to ensure that transparency is maintained.
2. All inputs based on expert judgement have been recorded for all analysed documents. In future expert judgement should continue to be properly justified to ensure that transparency is maintained.
3. The process to become AgBalance® Sustainability Expert and the selection of an independent AgBalance® Sustainability Panel should be formalized and adhered to, to ensure that robustness and reliability is maintained.
4. The quality assurance process has been implemented. Henceforth the process should include revision steps to ensure all open points have been closed. Furthermore, the reviewer takes the responsibility to assure the quality of the AgBalance® Model.
5. As already done for the previous documentation of a study (AgBalance® Input Data and Results), the newly added documentation (Scoping Document) should also be adjusted and approved by the project leader of the AgBalance® Team together with the client to ensure that transparency is maintained.

4 REFERENCES

The review covered different versions of the documents between October 2019 and February 2020. The latest versions used for drafting this statement are stated below:

- AgBalance technical background paper_v2.1 (07.04.2020)
- AgBalance_Framework_v1.1 (07.04.2020)
- Scoping document Case Study Broadbalk_v1.1 (15.04.2020)
- AgB Data Sheet - Broadbalk mineral vs organic fertilizer v1.1 (15.04.2020)
- I-Report_LCIA_Results - Broadbalk alternatives 2011-2015v1.0 (23.01.2020)
- I-Report template input data screenshot - Broadbalk alternatives 2011-2015_v1.0 (23.01.2020)
- Broadbalk Social Analysis_v1.0 (17.01.2020)
- IQR Template_planning and analysis phase_internal review_April2020 (15.04.2020)

5 DISCLAIMER

The statement of assurance neither includes the SEEBalance® method (social aspects) nor any applications that process the output of the AgBalance® Model. The input values for the AgBalance® Model were not verified in depth but via broad spot checks. The weighting scheme was only verified according to the defined parameters of the available example study; the selection of factors for the weighting scheme was not scrutinised in detail.

DNV GL's responsibility regarding this assurance engagement is to BASF SE and corporate divisions Sustainability Assessment, Global Sustainability - Agricultural Solutions, in accordance with the scope of work commissioned.

BASF SE is responsible for the content, methodology and application of AgBalance®. The stakeholders of BASF SE are the intended users of this Assurance Statement.

DNV GL disclaims any liability or responsibility to a third party for decisions, whether investment or otherwise, based on this Assurance Statement.

Our conclusions are based on the assumption that the information provided to DNV GL by BASF SE, as part of this engagement, is complete and true. Moreover, our conclusions are valid for the general methodology and not for its application to the assessment of any individual products. This assurance statement is valid for the version AgBalance® v2.0 Model and needs to be revised should any major changes occur within the scope or content of the AgBalance® v2.0 Model.

6 PERSONS INVOLVED

To ensure optimum conditions for our validation and verification work, we consulted our expert Dirk Vallbracht (DNV GL Business Assurance), who was already involved in previous projects on the AgBalance® Model.

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