

Guidelines WP4 Biocas to 100%

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Introduction

This document serves as the main guideline for the assessments that are done within Work Package 4. WP 4 aims to achieve three main goals:

1. Ecological and economic assessment of the BCA's (the assessments done by contributing partners will be brought together in a central tool, to be created by VHL)
2. Developing business models for the BCA's
3. Provide insight into legal issues related to implementation of the BCA's

This guideline refers to objectives 1 and 2.

Ecological assessment

The ecological assessment is recommended to be done through applying the consequential life cycle assessment (LCA) methodology. LCA is a comprehensive tool that provides the opportunity to give insight in various aspects of the biomass value chain. It is change oriented and incorporates consequences of using biomass for various purposes.

Scope and functional unit

The scope should include the biomass processing chain as aimed for by the respective BCA. The starting point of every chain will be the required biomass that will be cascaded through the collaboration of the alliances. Hence, a functional unit, which represents the function of the chain or system, is set as 1 ton of biomass with a specifically defined composition, that is cascaded and processed. In this way, alternative uses of the biomass can be considered where needed. Figure 1 provides an example a production or value chain. The end-point will depend on the system and or the specific products that are produced. The products, or intermediate products, that flow from the system will be considered to replace existing products that are produced from other sources, such as fossil sources. E.g. in the case of bioplastics from biomass, a specific amount of conventional fossil-based plastic will be replaced by the use of biobased plastics. Exact amount of replacement will depend of the specific case studied as well as the availability of data. Main geographical scope remains to be Western Europe. This includes specifically the weather conditions and the respective laws.

Example 1 ton biomass

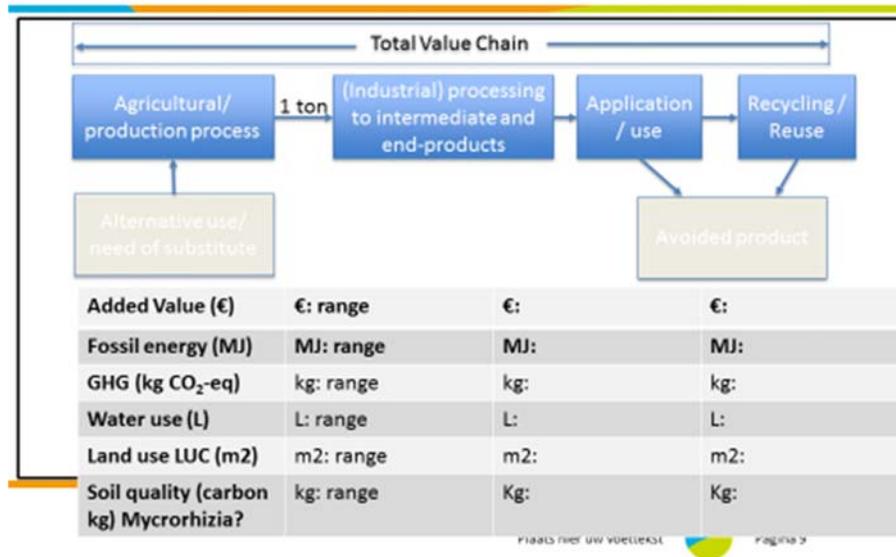


Figure 1: General example of value chain that is assessed, with the alternative use of the biomass and avoided products. The Table includes the suggested indicators for determining the ecological and economic impact.

Indicators and impact assessment

For the ecological assessment, at the minimum the following indicators are used: Greenhouse gas emission or climate change impact (with CO₂, N₂O, and CH₄ expressed as kg CO₂ equivalents per functional unit), (fresh) water use (expressed in liters per functional unit), land use and land use change (expressed in m² per functional unit; this includes the related C emission when land is converted to e.g. agricultural land), soil quality/ soil C changes, fossil energy use or depletion (expressed in MJ per functional unit).

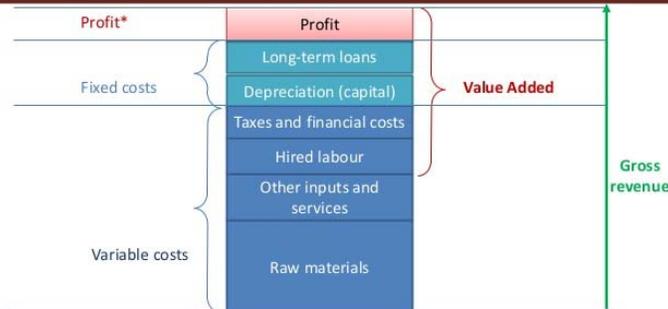
Extension to other indicators may include eutrophication, acidification, etc. A suggestion for impact assessment may be the ReCiPe impact assessment methodology with the midpoint categories (e.g. for reference please refer to:

http://www.rivm.nl/en/Topics/L/Life_Cycle_Assessment_LCA/ReCiPe).

Economic assessment

The economic assessment will follow the same line as the LCA and aims to include the fixed and variable costs and profit of each chain step. Figure 2 presents the build-up of the costs represented by: variable (or direct) costs, fixed (or indirect) costs and profit. Definitions of added value and gross revenue are given.

Structure of production costs for chain actors



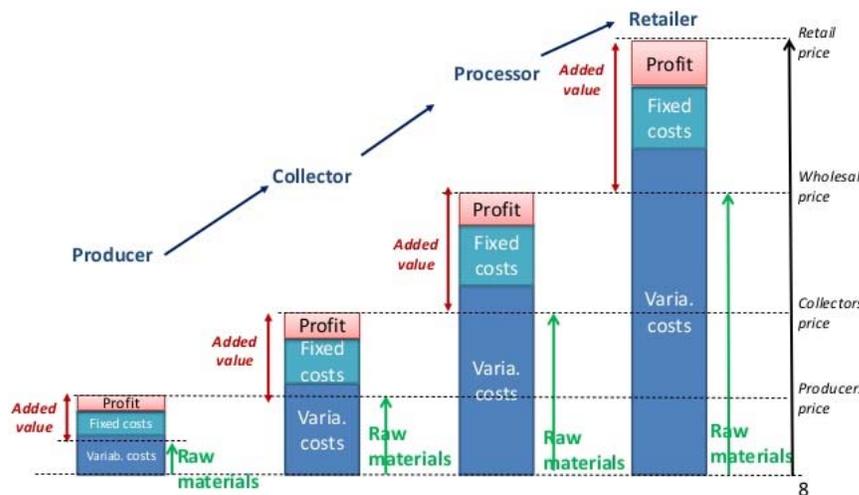
* Family labour involved in the enterprise is likely to be remunerated from profits rather than through fixed costs

Need to choose one common unit of product to compare costs and value added across value chain actors

7

Figure 2: Suggested costs and profit build-up of each step in the chain (<https://www.slideshare.net/ILRI/ssrevalter-jo-jan2015>).

Value added along the chain



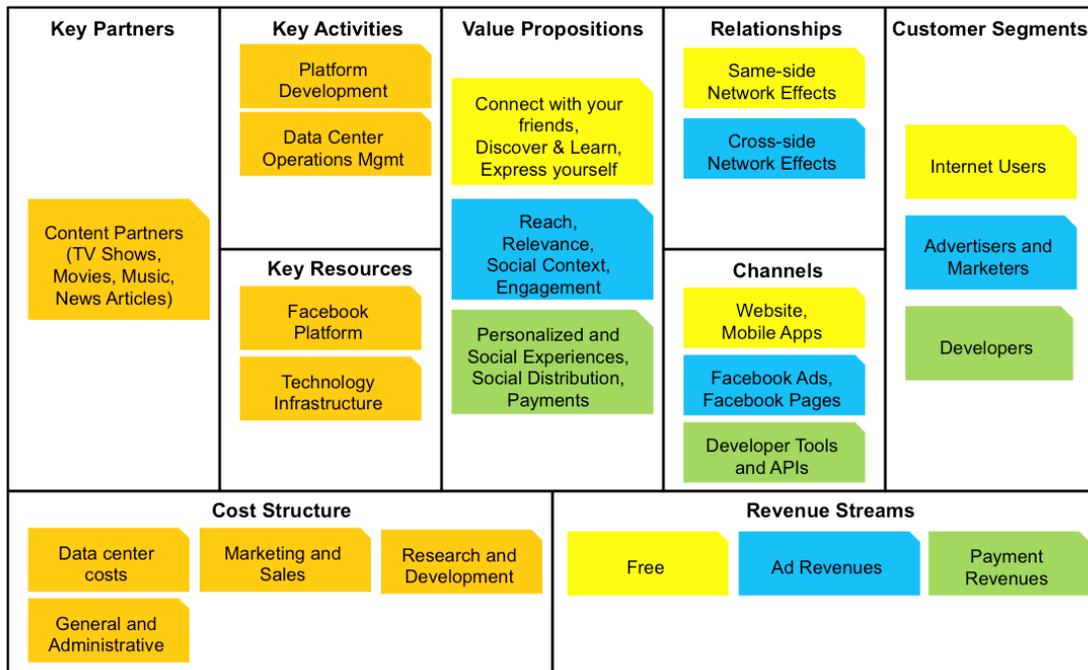
8

Figure 3: Build-up of value along the biomass cascade chains. Each step may include one or more businesses or stakeholders (<https://www.slideshare.net/ILRI/ssrevalter-jo-jan2015>).

Business model development

The business model development will follow the method of Osterwalder, i.e. the business model canvas extend by multi-stakeholder assessment. An example of the canvas is provided in Figure 4. Every business in the BCA will require to make one of these canvasses in order to develop their position within the BCA. Moreover, in addition a complete overview of the canvas may be developed of the whole chain.

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Figure 4: Example of the business model canvas as given by Osterwalder.