

Sustainability assessment of wood products: A comparison of the methods Ecological Footprint, MIPS and EFORWOOD

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Objective

In this study the three sustainability assessment methods Ecological Footprint, MIPS and EFORWOOD SIA are compared by means of the two wood products solid wood and particle board.

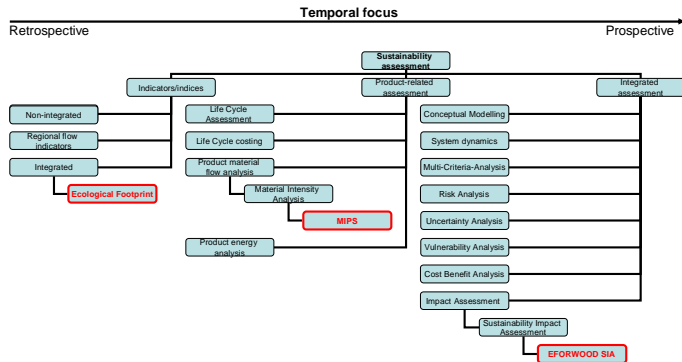


Fig. 1: The analysed methods in the broader framework of sustainability assessment (Ness et al., 2007, simplified)

Methods

Ecological Footprint:

How much productive land or sea is needed for the production of a product?

The area input (direct area and area for CO₂ absorption) is calculated and converted to global hectares.

Measuring unit: global hectare [gha]

MIPS:

How much material input is needed for the production of a product?

The resource inputs subdivided into the categories **abiotic**, **biotic**, **water** and **soil moved** are calculated.

Measuring unit: [kg]

EFORWOOD SIA:

How do economic, social and environmental sustainability impacts differ for forestry wood chains?

Indicators (ecological, economical, social) are calculated for every process along a forestry wood chain and aggregated.

Measuring unit: various, indicator-dependent

Case study

A generic production chain for solid wood and particle board represented in Fig.2 is analysed, involving an age class conifer forest land use type, regional transport, sawmilling, and particleboard mill. The store of a regional retailer is defined as the system boundary.

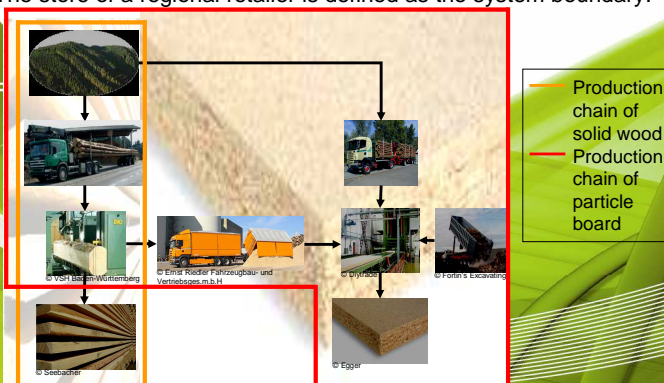


Fig. 2: Production process chains of solid wood and particle board

Results

Energy is the main factor leading to the results for the methods Ecological Footprint and MIPS. If a same level of energy efficiency is assumed for the sawmill and the particle board mill the solid wood clearly outperforms the particle board in the overall result. By assuming a low level of energy efficiency for the solid wood (Energy scenario 3) and a high level of energy efficiency for the particle board (Energy scenario 1) however this result may change in favour of the particle board. This is valid for the Ecological Footprint and the MIPS category 'air'.

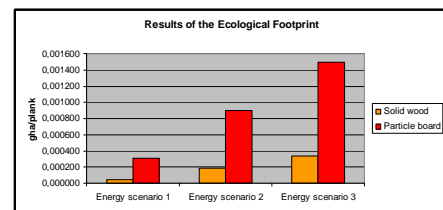


Fig. 3: Results of the method Ecological Footprint

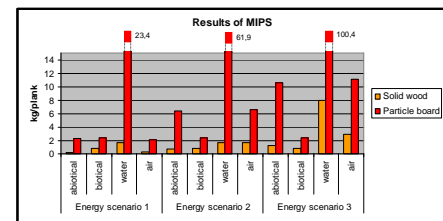


Fig. 4: Results of the method MIPS

Concerning the EFORWOOD SIA, solid wood shows the better results except for the social indicators 'Wages and salaries' and 'Employment'.

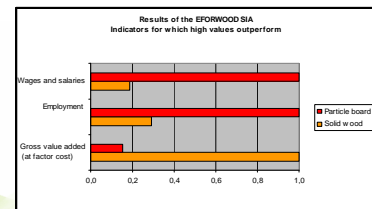
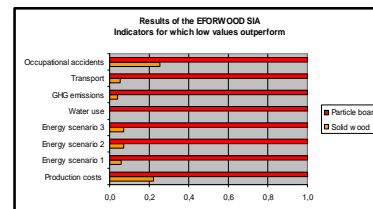


Fig. 5 and 6: Results of the EFORWOOD SIA

The results of the evaluation of the methods through a criteria catalogue show that the three methods vary in different aspects but not significantly in the overall score.

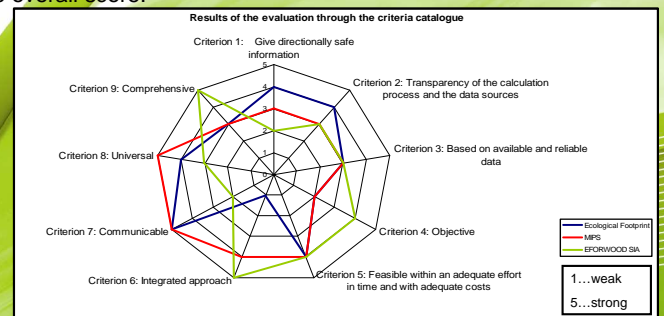


Fig. 7: Results of the methods' evaluation through a criteria catalogue

Conclusion:

- EFORWOOD SIA is more complete, yet ecological sustainability does not correspond to social sustainability
- Availability and reliability of the input data is essential for any method
- A combined SA of different methods is suggested

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Reference of Fig.1:

Ness, B., Urbel-Piirsalu, E., Anderberg, S., & Olsson, L. (2007). Categorising tools for sustainability assessment. *Ecological Economics*, 60(3), 498-508.