

Regional Social Life Cycle Assessment of wood-based products

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1. Introduction

Nowadays, an increase in the future biomass-based production activities in Germany is expected, driven by the Bioeconomy Strategy, recently launched by the German government (BMBF 2011). The term bioeconomy describes the use of renewable resources for biobased material and energy, whereas residual streams are either further used in a cascade or recycled. The question of how the production of biobased products affects society has not been addressed sufficiently yet. In order to investigate social performance of biobased products in Germany, further research on context-specific sLCA methods is needed. The authors of this study argue that the regional context, to which the study is applied, determines the socio-economic aspects of importance for a sLCA method. For this a research approach to be applied for the development of context-specific impact categories and subcategories needs to be developed. The main objective of the overall study is to assess socio-economic impacts of production activities in a decentralised wood-based bioeconomy in Central Germany.

2. Determination of context-specific socio-economic sustainability elements

The country's development stage, its institutions (laws, regulations or informal rules), specific sector characteristics and the local environment of companies need to be analysed to define context-specific impact categories. Therefore, considerations on different levels – national, regional and sectoral – are required to increase context specificity of socio-economic opportunities and risks from level to level. This research approach showed in Figure 1 aims to identify a sustainability baseline for the production of wood-based products in Central Germany (Saxony, Saxony-Anhalt and Thuringia) in order to define context-specific impact categories. Hence, on one side socio-economic key issues as well as opportunities for sustainable development are identified on three different levels. They are determined by analysing socio-economic indices such as unemployment rates, income or population structure. As research

sources scientific papers and other documents such as companies' sustainability reports or official statistics are used. On the other side the approach involves a stakeholder analysis to firstly identify stakeholders which are potentially affected by production activities and secondly to conduct in-depth interviews with experts in the field on the different levels. Within the following steps first results from the proposed research approach are discussed. First, socio-economic issues or opportunities, identified on the different levels, are presented. Second, it is discussed how they potentially determine the selection of impact categories. Afterwards, it is shown how the stakeholder analysis can extend the previous analysis on the national, regional and sectoral level.

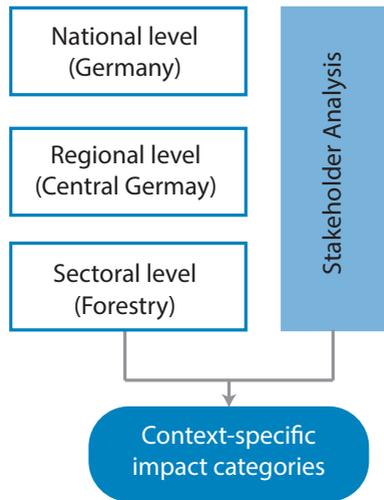


Figure 1: Determine context-specific impact categories

3. Results and Discussion

On the national level (Germany) several important aspects were identified: demographic change, long-term unemployment, gender pay gap, income inequalities as well as a lack of development in rural areas compared to cities (Statistisches Bundesamt 2012, Deutscher Bundestag 2013). Some relevant themes can be directly linked to products life cycles and thus be transferred into an impact category. For example, the gender pay gap can be directly linked to companies activities and can be transferred into the category discrimination. Other more general socio-economic

issues can, for instance, be linked by common companies measures which may lead to a sustainable development by counteracting future socio-economic issues. To mitigate the demographic change, for instance, adequate working time models for older employees are required in future. The legal system in Germany provides another specific example to how the context should determine the choice of adequate impact categories. In Germany legislation on minimum wage has not been passed until now. Thus, an impact category such as 'fair wage' cannot be defined by using a national minimum wage indicator in this case.

A further screening is done at the regional level (Central Germany); the geographic area where the production activities are located. Within this study the extraction of wood as well as main production activities take place in rural areas of Central Germany. In Central Germany the unemployment rate is with 9.6 percent above the average of Germany 6.9 percent (Bundesagentur für Arbeit 2014). The still existing regional differences between western Germany and the former eastern Germany are another context specificity which needs to be taken into account. Rural areas in the former East Germany are characterised by migration of young people. Within 2012 Saxony-Anhalt and Thuringia had the highest negative migration balance in Germany (Statistische Ämter des Bundes und der Länder 2013). Further, the demographic change will lead to a shrinking and aging population in rural areas. Thus, products life cycles creating employment in those areas have a positive impact on local development in short-term. Nevertheless, due to the decreasing population rate, qualified jobs are required in the long-term to maintain the rural areas. These specific socio-economic issues determine the selection of relevant socio-economic impact categories.

In order to contextualise the nature of relevant impact categories furthermore, a final sectoral analysis follows. The different life cycle stages such as harvest, transport and production can be linked to specific sectors. Hence, the sectors of the main production activities in the product life cycle are identified. As a wood-based bioeconomy depends on the local forestry sector as a raw material supplier it is of major importance for those considerations. But also the transport or wood manufacturing sector has to be integrated within the analysis. Based on this, appropriate categories are chosen which aim to advance sustainable development. To analyse the forestry sector regarding a sustainability baseline, national certification standards from the Forest Stewardship Council (FSC) or PEFC can be used to identify forest specific impact subcategories (FSC 2012, PEFC 2009). Generally speaking forest management concepts differ between forest ownership structures (state, municipal, private) and federal states. Some state-owned forests such as HessenForst, ForstBW, for example, have management concepts with specific sustainability goals and indicators (HMUELV 2012, ForstBW n.y.). However, to understand the status quo other information need to be taken into account. From a statistical analysis a rather high rate of fatal accidents in the forestry and agricultural sector besides the construction, traffic and service sector was identified (Baua 2012). Those data were validated by interviews indicating that using a harvester is more secure than motor-manual logging. These data may lead to a context-specific subcategory 'accidents during harvest'.

This stepwise analysis is accompanied by a stakeholder analysis. Actor groups were identified which are potentially affected by the production activities under study. Within in-depth interviews experts were asked for socio-economic issues within their respective fields. Within this study, representatives from the FSC and PEFC for instance on the national as well as regional level were interviewed. Further, representatives from local authorities e.g. from the Ministry of Science and Economy of Saxony-Anhalt and associations such as trade unions were asked. Information from the interviews, for example, lead to the conclusion that the private owned forest structure entails the highest risks for socio-economic sustainability.

It can be concluded that the level of development (national level) and the specific context e.g. the resource base has to be taken into account, in order to determine context-specific impact categories. In other words not only the sustainability baseline has to differ between countries, depending on its level of development, also impact categories need to be adapted to a specific context. The benchmarks for sustainability in high-income countries needs to be higher compared to low-income countries. The nature of the impacts assessed is determined by the products life cycle itself as for wood-based products, the focus is on social sustainability in forest management. This further is specified for the geographic area where the resource is coming from, in this study Germany. This method triangulation should create a complete picture about socio-economic key issues in the context of an emerging wood-based bioeconomy and is the basis for the impact category development.

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