

Analysis of Standards, Certifications and Labels for Bio-based Products in the Context of Sustainable Bioeconomy

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ABSTRACT

Bioeconomy has been proposed as a pathway to sustainable development in many countries. However, the difficulties in defining the bioeconomy boundaries at the national level might necessitate the adoption of a sectoral approach to monitor and evaluate the success of its development. In this resolution, standards, certifications and labelling (SCL) schemes for bioeconomy-related sectors might be an essential source of data. The study evaluates the potential to use SCL schemes as a source for monitoring and evaluating sustainable bioeconomy, by analysing the sustainability aspects (chain-of-custody, environmental, economic and social themes) considered in selected SCL schemes. A variety of SCL schemes for different stages of the bioeconomy value chains were subjected to analysis on whether they consider internationally agreed aspirational principles and criteria for sustainable bioeconomy. The aspects most frequently mentioned by the requirement lists of the analysed SCL schemes were identified, along with the highlights on the least-frequently mentioned sustainability topics.

KEYWORDS

Bioeconomy, Biomass, Bioproducts, Certifications, Labels, Standards, Sustainability

INTRODUCTION

Bioeconomy is the utilization of biomass to produce not only food and feed, but also energy, chemicals and materials. Due to its promising potential in addressing global challenges, bioeconomy has been directly or indirectly included in policy agendas worldwide as a way to decouple growth and petroleum dependency (Bracco, Calicioglu, Gomez San Juan, & Flammini, 2018; and Bracco & Flammini, 2018). However, bioeconomy is not sustainable *per se*, especially considering the competition it poses for natural resource inputs for food (Calicioglu, Flammini, Bracco, Bellu, & Sims, 2019), and other aspects such as whether bioeconomy improves working conditions for the employees. Furthermore, the impact of bioproducts and their value chains are not inclined to territorial boundaries, and they rather globally affect society and ecosystems. Therefore, information on the overall sustainability of the bioproducts is of particular concern for sustainable development.

Data availability can often be an issue in sustainability monitoring frameworks related to bioeconomy. Nevertheless, standard, certification and labelling (SCL) schemes for biomass and

DOI: 10.4018/IJSR.2019010101

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bioproducts can provide insights on the overall sustainability of bioeconomy at the product level, as they increase information flows throughout the value chain and in the market (FAO, 2003). They help all value chain actors (producers, manufacturers, distributors, traders and consumers) disclose information and choose the right products for their purpose. Over the last years, several SCL schemes have been developed by the private and public sectors (e.g. OK biobased Vinçotte), as well as by international organizations (e.g. Green Gold Label). In the context of bioeconomy, existing SCL schemes prove the bio-based content of a product, intend to demonstrate the extent of its sustainability, or inform on the product end-of-life options (e.g. biodegradability, compostability and disintegration of a product). For instance, the European Union (EU) delegates the evaluation of the sustainability of biofuels entering its market to voluntary schemes approved by the Commission (Bracco, 2015). This EU biofuel regulatory regime introduces a double delegation: the European Commission entrusts the partners of the approved SCL schemes to ensure biofuel sustainability; and the schemes delegate third party auditors to guarantee their behaviour.

SCL schemes send a message to the actors of the value chain and the consumers. This information increases access to market and brand value, confidence, traceability, and facilitates risk management (due diligence system). SCL schemes often help companies comply with national and international legislations, such as the international labour standards set by the International Labour Organization (ILO) or environmental law. Consumers, particularly in developed countries such as the members of the EU, are more and more prepared to buy goods and services which have reduced environmental impacts (European Commission, 2008). For example, consumers are often willing to pay a higher price that is also called “Green Premium” for a more sustainable bio-based product (Carus, Eder, & Beckmann, 2014; Dammer et al., 2017). Therefore, by increasing market information, the certification of a bioproduct can also enhance the development of its market and favours, for instance, public procurement (Dubois & Gomez San Juan, 2016; Lynch, Klaassen, & Broerse, 2017).

Despite the needs in bioeconomy sustainability monitoring and the potential opportunities that SCL schemes offer as a data source, a comprehensive analysis of the current status on how sustainability is addressed in bioeconomy-related SCL schemes is lacking. In this respect, this study aims to assess which sustainability criteria are requested by the existing SCL schemes for bio-based products, in order to determine to what extent the SCL schemes can be used to monitor and evaluate the sustainability of bioeconomy development at the product level.

The study presents certification options for different types of biomass and bioproducts, and analyses the aspects considered by the selected certification schemes, mainly focusing on whether a given certification option considers the chain-of-custody (CoC) and sustainability standards. To this end, in order to outline sustainability criteria, a collation of topics has been identified on the basis of the aspirational principles and criteria for sustainable bioeconomy (summarised in Appendix A), developed and validated by the International Sustainable Bioeconomy Working Group (ISBWG). This working group comprises representatives of governments, research and international organizations, and it has been established by the Food and Agriculture Organization of the United Nations (FAO).

In the scope of this study, the analysed SCLs cover different stages of the value chain of a bio-based product, from biomass to biomaterials and final bioproducts entering the market. The study refers to products from the following bioeconomy sectors: agricultural sectors (agriculture, forestry, and fisheries), bio-based construction materials and furniture, pulp and paper, bio-based textiles, bio-based chemicals and polymers, bioenergy; and to end-of-life certification. Food and feed are excluded. The selection of certification schemes for biomass, forest products, agricultural commodities, biofuels and biomaterials, prioritises those standards that are not applicable just in one country because the analysis aims to be global in scope. In the context of this work, products of biological origin that are not classified under another listed category are considered “other” bioproducts. For the “other” bioproducts and end-of-life certification schemes, this study also includes a few national SCLs, since there are only a limited number of available initiatives worldwide. A systematic analysis of the SCL schemes for the final products in the mentioned categories is performed, particularly because the compilation under these categories have not been previously undertaken comparatively.

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