Bioeconomy is local and requires tailor-made performance indicators for informed decision making: a review of existing indicators and insights from stakeholders consultations

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Abstract

Life Cycle Assessment (LCA) has been widely adopted and has proved its relevance for informing on potential environmental impacts (eLCA) of products, services and/or massive investments. This is particularity true for decisions to be taken with regards to bioeconomy investments, confronted with the challenge of sustainably mobilizing additional biomass and eventually energy resources for products and services demanded in the economy. However, LCA extension to Life Cycle Sustainability Assessment (LCSA), which integrates economic (Life Cycle Cost) and social (Social Life Cycle Assessment) aspects, has yet to gain equally widespread acceptance. Mobilizing eLCA alone then limits the possibilities of correctly reporting on the three dimensions of sustainable development with the aim of supporting relevant bioeconomy policy making. Moreover, due to a lack of understanding of some LCA indicators, decision makers and stakeholders in the bioeconomy sometimes find it difficult to exploit the results of these assessments. This is a shortcoming to overcome in order to ensure and accelerate the investments needed to launch a strong and sustainable bioeconomy in Europe.
The research presented herein aims to overcome this limitation. It builds on the premise that bioeconomy, unlike petro-economy, is local and happens on territories with different realities across Europe. The aim is twofold: (i) establishing a conceptual framework providing bioeconomy stakeholders with key performance indicators (KPI) that they understand, need and that are operational, for informed decision-making towards sustainable and resilient bioeconomy and (ii) enabling stakeholders to play an active role in selecting and developing these KPI.

This work is part of an ongoing study, of which the 3 first phases are performed; the results of these will be presented herein. First, we reviewed the literature reporting indicators for the wide sectors covered by the bioeconomy concept, relying in particular on the work

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of the European Union(1) and the Food and Agriculture Organization (FAO) of the United Nations(2). It led to a set of more than 700 indicators, that we assembled and organized within a common, flexible referential framework, making it possible to account for economic, environmental and social effects, but also sectoral particularities (agricultural, forestry, fishery, food and agroindustry, bio-based construction material and furniture, pulp and paper, bio-based textiles, bio-based chemicals and polymers, healthcare and bio-pharmaceutical and bioenergy).

Second, 27 interviews were conducted with selected European experts in the field of bioeconomy, agronomy, social and economics sciences, prospective, agriculture and multi-criteria. These were 1-hour semi directive online interview, the purpose of which was, among other things, to capture the concerns of various stakeholders in the bioeconomy; to identify relevant indicators, methodologies or conceptual frameworks with regards to bioeconomy decision-making; and to confront our initial working hypotheses with the opinions of experts.

These interviews and the initial set of 700 indicators were used to propose and conduct a collective intelligence workshop. During this workshop, the participants first established the specific characteristics of the territory under study. These characteristics were organized around the triptych of vulnerability, opportunity, and territorial/political objectives, which was then used to define a limited list of tailor-made indicators that were ranked by the stakeholders.

(1) https://knowledge4policy.ec.europa.eu/bioeconomy/monitoring_en

(2) https://openknowledge.fao.org/server/api/core/bitstreams/95937318-a0be-40d5-82b2-2277dd98add5/content

Keywords: Indicators, circular bioeconomy, territoire