Framing EU biomass supply and uses into a social-ecological context for policy support

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Résumé

Ten years ago, a mandate was given to the Joint Research Centre (JRC), by twelve European Commission (EC) services to provide long-term data, analysis, and forward-looking modelling on biomass supply and demand within the European Union (EU) and in the global context. The JRC was, at the time, tasked with assessing biomass flows between supply and demand as a basis to understand the competition and synergies between different sectors for biomass resources, with the objective of assisting the policy-making process to implement policy measures, evaluate policy options and provide elements relevant for future impact assessments. This effort was named The JRC Biomass Mandate.

The scope of the EC's scientific arm included creating a comprehensive knowledge base on biomass, developing tools for assessing biomass flows and availability and evaluating impacts of biomass extraction and use, in the present and in forward looking exercises. The research covers all sources of biomass: agricultural, forest, marine and freshwater, and waste; and includes an assessment of the competition and the synergies between sectors for biomass resources.

Throughout this decadal work, the JRC's findings have been updated in quantitative terms, and the overall findings are constant: there is a steady increase in use of biomass, both recycled and newly sourced. Indeed, what motivated the initial inception of the JRC Biomass Mandate is that there is little doubt that our current overall use of biomass is unsustainable, this had already been acknowledged ten years ago and is still true today.

We explore how framing the issues around biomass, and natural resource management in general, is key to improving scientific support for bioeconomy-related policy. We argue that two basic premises must be upheld for scientific support to be legitimately used as evidence for policymaking: contextualisation and deliberation.

Contextualisation is the broadest concept presented here because it spans both the scientific and ethical aspects of scientific support to policy. Research for policy support for natural resource management and use requires adequate framing, linking the natural resources to their sources (e.g. the ecosystems, or in the case of waste, the social systems). Thus, reporting on biomass quantities for bio-based branches of the economy should be accompanied by both the environmental and social or human context. This approach is an acknowledgement that continuous interaction between nature and society shapes the form and function of social-ecological systems, knowing that social (which includes economic) and ecological subsystems

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are coupled and all the processes within social-ecological systems have a double nature: an ecological (material) one and a social (economic and historic) one – an implication often neglected in studies on natural resources.

Also related to contextualisation is ensuring that the scientific support is able to give a system's level assessment of the biomass demands, availability, extraction etc., also considering its future availability. We argue that researchers should help renew focus on those urgent questions that are most relevant to broad, system-level assessment, to support cross-policy coherence. As society pursues increasingly ambitious goals in such existential domains as sustainability and bioeconomy, adopting systems thinking in foundational research is becoming more and more essential.

The interconnectedness between natural ecosystems and human activities means that any policy affecting biomass can have far-reaching consequences-from impacts on food, housing and energy up to biodiversity and soil health to those on climate regulation, social equity, human health or economic stability. Systems thinking provides a structured way of assessing how changes in biomass lifecycles influence these diverse phenomena, helping policymakers understand the broader implications of their efforts and to navigate complicated decisions. It is an approach that gives focus on the interconnections between components, rather than on components in and of themselves, adding nuance and breadth of understanding to observed phenomena. In the context of biomass and its management, a systems approach means first and perhaps foremost acknowledging that the many processes of biomass extraction, transformation, use, and disposal are tangled up with broader social-ecological dynamics.

The points elaborated above relate to another aspect of contextualisation: the ethical implications of providing scientific support to policy. As researchers are normally human beings, there is an inevitable personal and emotional element to our work, thus scientific findings are the result of a series of choices: which problem to tackle, which method to apply and based on which assumptions, which data to present, and how to interpret. What constitute a relevant fact, or a relevant set of data is conditioned by the larger social and historical context. Scientific endeavours are embedded in society-thus reflecting prevailing social and historical conditions. Reflection and transparency about normative assumptions, the preanalytical vision, the limitations of the analysis and uncertainty of the results, will make our support to policymakers more effective, qualifying our results in a context. Possibly, offering a set of options, or an option space, linked to varying normative assumptions and visions, and the contextualised implications of decisions, can provide the basis for evidence-based decision making.

This brings us to the second element we have identified as critical to scientific support for policy: Deliberation. With a set of options presented to the policymaker, there is no clear course of action and deliberation is needed to decide the best way forward for the collective good. Deliberation is needed early on in the process, in the problem framing phase, in the identification of boundaries of the 'option space' and question how one option can be judged 'better' or 'worse' than the other. This is even a sign of reflexive governance. Deliberation allows decision-makers to remain agile in times of change, and to come to agreeance on sets of responsible actions to be taken towards the management of wicked problems, after acknowledging the implications of uncertainty in the available analysis. This is especially fundamental in complexity, such as bioeconomy futures. Here, depending on who you are talking to, both the problem definition and solution set are multi-faceted across areas that cannot be simply 'aggregated' or 'combined' as they concern challenges and problems of very different nature (e.g. environmental degradation versus human rights). Different representations of the system of interest can be expected to be both equally legitimate and necessary. Decisions will therefore unavoidably 'disappoint' a part of the community. The role of scientists must there include to provide the instruments and means to ensure transparent and credible decision-making process, which can be accepted by all concerned communities. Stakes are high as the ultimate price of failure is an ecological and societal collapse. Novel decisions are urgent as current solutions are limited, ineffective, unsustainable and contested.

In summary, the experience of a decadal partnership between science and policy on the specific topic of biomass leads us to conclude that reporting on numbers, e.g. biomass supply and uses) is not, while being a necessary precondition in itself, enough to support policy and cannot, in itself, lead to policy coherence. A proper contextualisation and framing of scientific evidence is required, which leads to an increase in the quality of deliberation and hence more inclusive and coherent policy making.

Mots-Clés: Biomass, policy support, social, ecological system, system, modelling, uncertainty, post, normal, European Commission