



The Bioeconomy and the Transformation of Food Systems: the links between BioMonitor and a Report by a European Commission’s High-Level Expert Group

Abstract

The European Commission has established a High-Level Expert Group (HLEG) to assess how to strengthen science–policy interfaces for better food systems governance. In June 2022, the Directorate-General for Research and Innovation of the European Commission published a report by the HLEG entitled *Everyone at the Table: Transforming Food Systems by Connecting Science, Policy and Society*. In this policy brief, we take a closer look at some of the intersections of the findings of the HLEG report with the outcomes of the BioMonitor project.

Key points

Contemporary food systems are argued to lack sustainability. Food systems and their transformation are an inseparable part of the bioeconomy

The High-Level Expert Group (HLEG) has identified six critical functions of the science-policy-society interfaces that need to be fulfilled to transform food systems

BioMonitor supports the future of food systems through modelling, forecasts and scenarios

Introduction

Contemporary food systems, it is argued, lack sustainability, and policymakers in developed countries are increasingly faced with the need to improve them, especially in the face of the current human and planetary health problems. Any decisions taken to support food system transformation should be based on the best scientific evidence and other forms of knowledge.

In its report, the HLEG has identified six critical functions of the science-policy-society interfaces that need to be fulfilled to transform food systems (HLEG, 2022):

- **Engage stakeholders** through dialogue at multiple scales across the food system
- **Build capacity** at national and local levels to translate evidence into impact
- Ensure **open access to data** from across the food systems
- Explore the future of food systems through **modelling, forecasting and scenarios**

- Deliver **independent assessment reports and policy pathway** documents
- **Create a forum for diplomacy,** standards and target setting, and policymaking

The focus and output of the BioMonitor project are closely related to three of the functions above: stakeholder engagement, data collection and processing, and exploring the future through modelling different possible scenarios. In the remainder of this policy brief, we will briefly discuss each of the three functions from the perspective of BioMonitor.

Reducing the information gap in the EU bioeconomy

Throughout the project, we have organised several meetings—in person and on-line—with the **bioeconomy stakeholders**. The latter appreciated the added value of the project’s results and the prospect of the BioMonitor toolbox. However, we have learned that scientific results are often complex and not always easy to

interpret for non-scientists who would like to apply them in their daily work. This holds, for example, for policymakers who are interested in arguments grounded in rigorous scientific work but would prefer presentations to directly meet their specific knowledge needs.

One of the objectives of the BioMonitor project has been to **reduce the information gap present in the EU bioeconomy** by restructuring existing data and modelling frameworks. This goal refers directly to the third function of the science-policy-society interfaces as proposed by the HLEG. Ultimately, BioMonitor aims to give a clearer picture of how the bioeconomy affects our lives today and in the future. Through recent policies (e.g., the **Bioeconomy strategy and the European Green Deal**), Europe aims to solve several problems associated with social inequality and climate change and provide a better future for generations to come. Various levels of data gaps have been observed in different bio-based sectors and in different European Member States. National accounting statistics help balance this out and set a baseline for EU countries to compare their results at an international level. BioMonitor closes the data gap when measuring the bioeconomy by employing various short-, medium-, and long-run methodologies. Doing so enhances assessment tools that can guide industries and policymakers in setting out long-term strategies for developing the bioeconomy. Although not all (raw) data of the project could be made open access, we have presented them free of charge in a processed form (e.g., indicators) in the **DataM** portal of the European Commission.

In BioMonitor, much effort has been dedicated to exploring the future of the European bioeconomy. In particular, **BioMonitor has employed state-of-the-art simulation models** to help illustrate the bioeconomy's role in achieving the objectives of different EU-based policies like the Green Deal. Moreover, different policy scenarios are being crafted to give us a

glimpse of our possible future with the bioeconomy in the picture. The BioMonitor Model Toolbox encompasses several quantitative economic models that cover different areas of the EU bioeconomy:

The Modular Applied GeNeral Equilibrium Tool (**MAGNET**) is an ex-ante, multi-region, multi-sector simulation model. It has been used extensively for impact analyses relating to the agricultural sector, natural resources and the environment.

The **EFI-GTM** model is a multi-regional and multi-periodic partial equilibrium model of the global forest sector. It depicts the system which consists of:

- wood supply
- forest industries (sawmilling, wood-based panels, pulp, and paper industries)
- production of wood-based energy and biofuels
- demand for forest industry products
- woody biomass for energy
- international trade in wood and forest products.

EFISCEN is an environmental model that projects the development of European forest resources for up to 50 or 60 years based on different policy and management scenarios from the regional to the European scale. It provides key information on policies related to biomass availability for supplying the bioeconomy with raw materials and on Land Use, Land Use Change, and Forestry (LULUCF) issues and targets.

AGMEMOD is a system of partial equilibrium models for the agricultural, fisheries, and food sectors. The regional focus of the model is built on its representation of the agricultural commodity in each individual EU Member State and neighbouring candidate and other countries. AGMEMOD covers the most important agricultural activities of each country in detail.

BioMAT is a new multi-regional partial equilibrium model for innovative bio-based product markets focusing on the EU and its Member States. It can provide projections for the bio-based markets based on current trends and policies

and simulate the impacts of changing trends and policy options on these markets in the medium- (2030) and long term (2050).

We presented the results of different scenarios produced by these models at the meetings with stakeholders and incorporated their feedback to improve the performance of the models. Another form of validation of the models' results is case studies that investigated the details of several phenomena of the EU bioeconomy. The BioMonitor project conducted seven of them, and their short summaries can be found in the section *Technical insights* on the website of the BioMonitor project.

Conclusions

To conclude, food systems and their transformation are an inseparable part of the bioeconomy. It is, therefore, reassuring that the focal points of the BioMonitor project (i.e., data, models, and engagement of stakeholders) are also reflected in the recent report by the EC High-Level Expert Group on strengthening science-policy interfaces for improved food systems governance. These three areas should also be points of attention for the EU and national policymakers as they are necessary for quantitative assessments of the development of the EU bioeconomy and they help determine how the bioeconomy affects our everyday lives.

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