

parlons graphiques

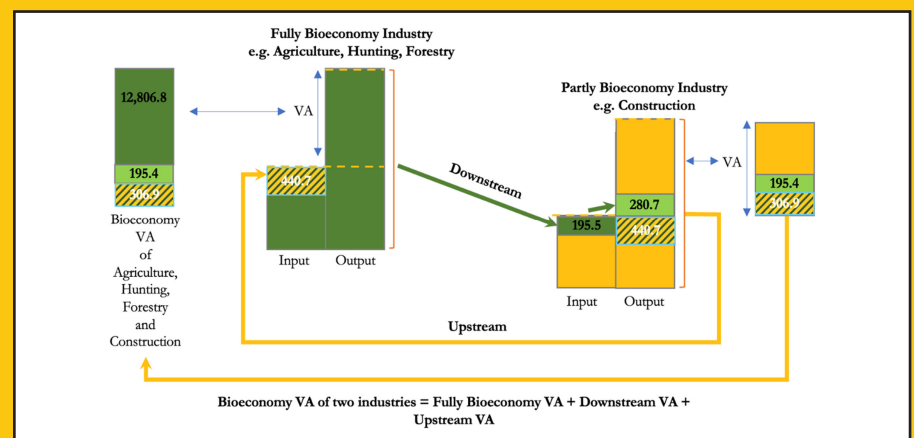
Kutay Cingiz, Hugo Gonzalez-Hermosa, Wim Heijman and Justus H. H. Wesseler

Measurement of the EU Bioeconomy and the Inclusion of Downstream and Upstream Linkages Mesure de la bioéconomie dans l'Union européenne et prise en compte des liens en aval et en amont Bewertung der EU-Bioökonomie und die Einbeziehung von vor- und nachgelagerten Sektoren

The development of the bioeconomy, according to the European Commission, is a key strategy for achieving climate neutrality by 2050. The bioeconomy will feature high on the EU green policy agenda for many years to come, as evidenced by the release of the European Green Deal and the updated bioeconomy strategy 2018 (EC, 2018) and efforts to monitor the sector (EU, 2021). Therefore, we developed a technique to measure EU bioeconomy value added (VA) across countries, with a view to monitoring the progress and impact of the EU's bioeconomy strategies.

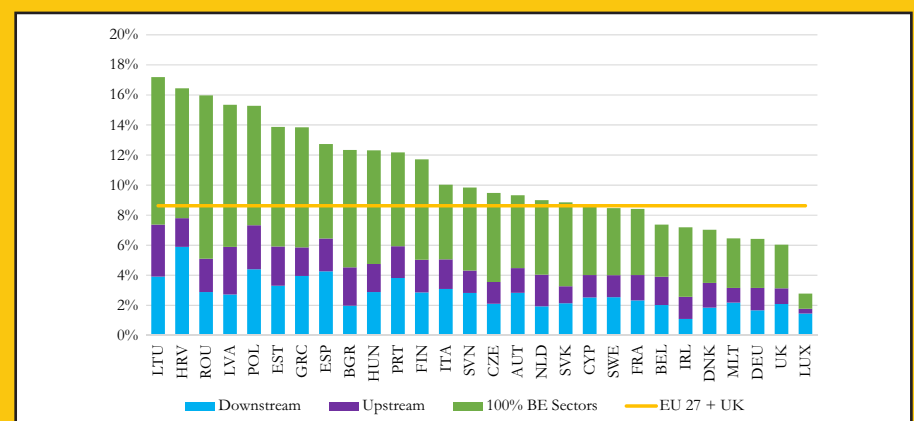
Wesseler and von Braun (2017) provide an analysis of the methodological challenges and stress the importance of expanding the bioeconomy domain beyond traditional industries. Thus, for an accurate measurement of the shares of the bioeconomy in VA, we include the relevant economic industries, categorised as fully and partly bioeconomy industry. Fully bioeconomy industries use and convert biological resources. They include for example the agriculture and food sector, the forestry sector and the pulp and paper sector. They provide inputs to other industries that further process those inputs (downstream). Those are considered partly bioeconomy

Figure 1: Upstream, downstream input-output flow of the Netherlands, 2018

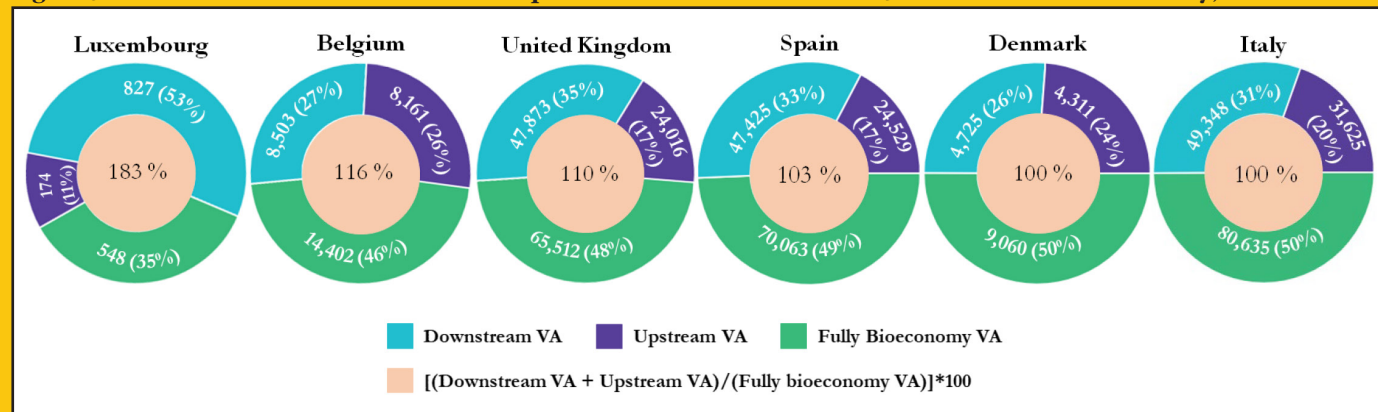


Notes: Value-added is the difference between output and input. Downstream represents the input flow to the construction industry from the agriculture, forestry and fishery industries (green shaded) which generates (proportional to the rest of the inputs) VA for the construction industry. Upstream represents the output flow from construction industries to the agriculture, forestry and fishery industries as input (yellow shaded) which generates (proportional to the rest of the outputs) VA for the construction industry. The values are in million Euros.

Figure 2: EU Member States bioeconomy shares in value added, 2016–2018 average



Notes: The percentage values are calculated by the ratio of bioeconomy VA to total VA. The bioeconomy VA is defined as the summation of all downstream, upstream, and fully (100%) bioeconomy VAs.

Figure 3: Countries where downstream and upstream VA constitutes at least 50% of the total bioeconomy, 2018

Notes: The centre indicator is the ratio of bioeconomy downstream and upstream VAs to fully bioeconomy industries VA in percentage. The figures in the ring represent the value of each component in million Euros, with their relative contribution to total bioeconomy VA in parentheses.

industries as they also use inputs from other industries. Further, industries that provide inputs to the fully bioeconomy sectors (upstream) are considered partly bioeconomy industry (Figure 1) (see Cingiz *et al.* (2021) for the details of fully and partly bioeconomy industries included).

Finally, we define the value added of the bioeconomy as the summation of all downstream, upstream, and fully bioeconomy VAs. We implement the proposed measurement approach across all EU Member States. The input-output tables are taken from OECD statistics (OECD, 2021). For nominal to real value conversion, we use the Harmonized Index of Consumer Prices (HICP) from Eurostat (base year 2015) and the nominal exchange rate coefficients are taken from OECD statistics.

Results

Across EU Member States, the average share of the bioeconomy in

VA for the 2016–2018 period ranges from 2.8 per cent in Luxembourg to 17.2 per cent in Lithuania (Figure 2). Except for Luxembourg, the share is above 6 per cent in all Member States for both periods. For the EU-27 and the United Kingdom, the share of the bioeconomy in VA is 8.6 per cent for the 2016–2018 period.

Figure 3 illustrates the relative importance of upstream and downstream bioeconomy VA in selected countries with the most developed bioeconomies. In Luxembourg, Belgium, United Kingdom, Denmark, Spain and Italy, the total of downstream and upstream VA constitutes at least 50 per cent of the total bioeconomy.

This shows that there is a strong linkage and integration between these two sector types. The bioeconomy VA generated outside the primary bioeconomy industries can create more VA than from the primary bioeconomy industries. Partly

bioeconomy industries, through upstream and downstream linkages, make a significant contribution to the entire bioeconomy and therefore, should also be considered when discussing the significance of the bioeconomy in the overall economy.

Further information available at: https://datam.jrc.ec.europa.eu/datam/mashup/BM_BIOECONOMIC_SHARES/index.html.

Acknowledgement

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[Correction added 12th December 2023, after first online publication: Acknowledgement section has been included in this version.]

Further Reading

- Cingiz, K., Gonzalez-Hermoso, H., Heijman, W. and Wesseler, J.H.H. (2021). A cross-country measurement of the EU Bioeconomy: an input–output approach. *Sustainability*, **13**(6): 3033.
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- OECD (2021). Input-Output Tables. <https://stats.oecd.org/>
- Wesseler, J. and J. Von Braun (2017). Measuring the bioeconomy: Economics and policies. *Annu. Rev. Resour. Econ.*, **9**: 275–298.

Kutay Cingiz and Justus H. H. Wesseler, Wageningen University and Research, Netherlands.

Emails: kutay.cingiz@wur.nl; justus.wesseler@wur.nl

Hugo Gonzalez-Hermosa, JRC, Spain.

Email: bugogonzalezhermoso@gmail.com

Wim Heijman, Czech University of Life Sciences, Prague; and Wageningen University and Research, Netherlands.

Email: wim.heijman@wur.nl