



Bioeconomy in the EU MS

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Bioeconomy definition and existing bioeconomy strategies in the EU MS

EU Bioeconomy Strategy from 2018:

“Sustainable and circular bioeconomy covers all sectors and systems that rely on biological resources (animals, plants, micro-organisms and derived biomass, including organic waste), their functions and principles.

It includes and interlinks: land and marine ecosystems and the services they provide; all primary production sectors that use and produce biological resources (agriculture, forestry, fisheries and aquaculture); and all economic and industrial sectors that use biological resources and processes to produce food, feed, bio-based products, energy and services” Source [1]

National strategies

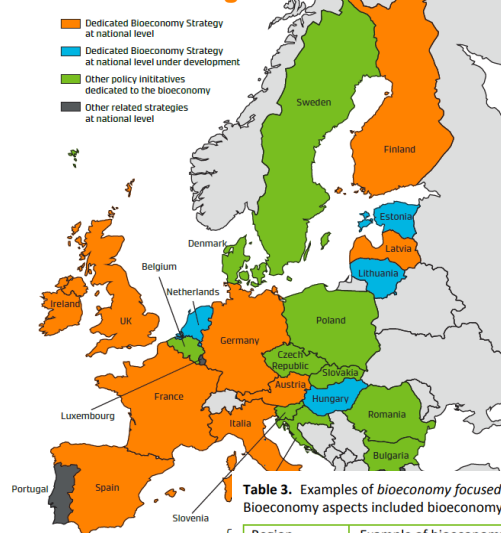


Table 3. Examples of *bioeconomy focused* or *bioeconomy related* regional strategy, policy or initiative against Bioeconomy aspects included *bioeconomy focused* or *bioeconomy related* regional strategy, policy or initiative.

Region	Example of bioeconomy related regional strategy, policy or initiative	Example of bioeconomy focused regional strategy, policy or initiative	Year of publication	Bioeconomy aspects included bioeconomy focused or bioeconomy related regional strategy, policy or initiative
Alto Tâmega (PT)	Integrated strategy for territorial development		2018	Resource efficiency, smart specialisation
Campania (IT)	Rural programme		2014	Resource efficiency, circular bioeconomy
Castilla y León (ES)		Circular bioeconomy programme	2016	Circular bioeconomy
Cataluña (ES)		Bioeconomy sector report	2018	Circular bioeconomy
Central Finland (FI)	Rural programme		2017	Resource efficiency, circular economy, bioeconomy
Emilia-Romagna (IT)	Smart specialization strategy		2015	Circular bioeconomy
Extremadura (ES)	Extremadura2030		2018	Bioeconomy
Flanders (BE)		Strategy for a sustainable and competitive bioeconomy	2014	Smart, material- and energy-efficient circular system
Friuli Venezia Giulia (IT)	Smart specialization strategy		2017	Circularity and sustainability

Regional strategies



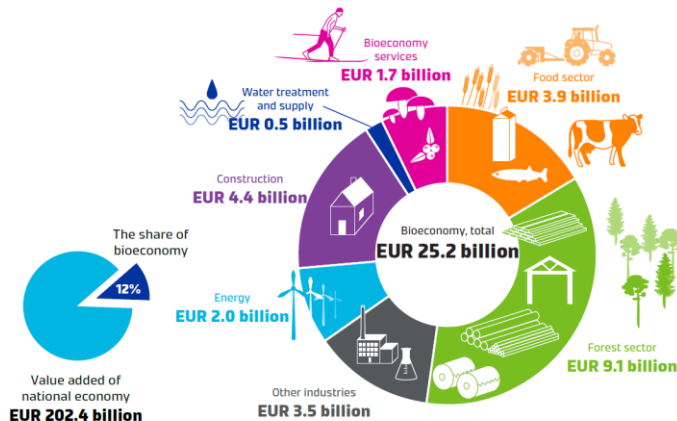
Bioeconomy in Finland

2014 (revised version in 2021)



Source [3]

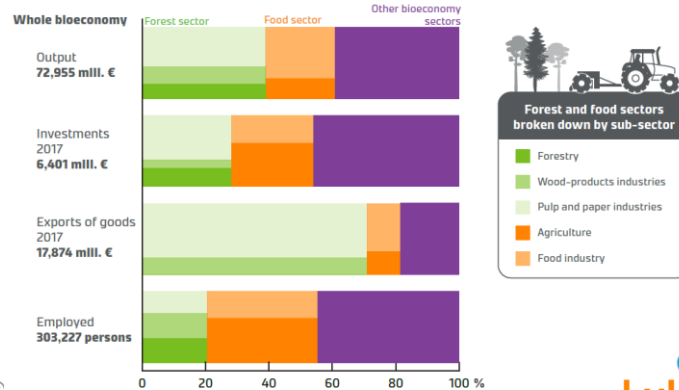
VALUE ADDED OF BIOECONOMY, 2018



Preliminary data Sources: Statistics Finland and Natural Resources Institute Finland



FOREST AND FOOD SECTORS IN FINLAND'S BIOECONOMY, 2018



* Preliminary data Sources: Statistics Finland and Natural Resources Institute Finland



Bioeconomy sectors in the EU MS

National

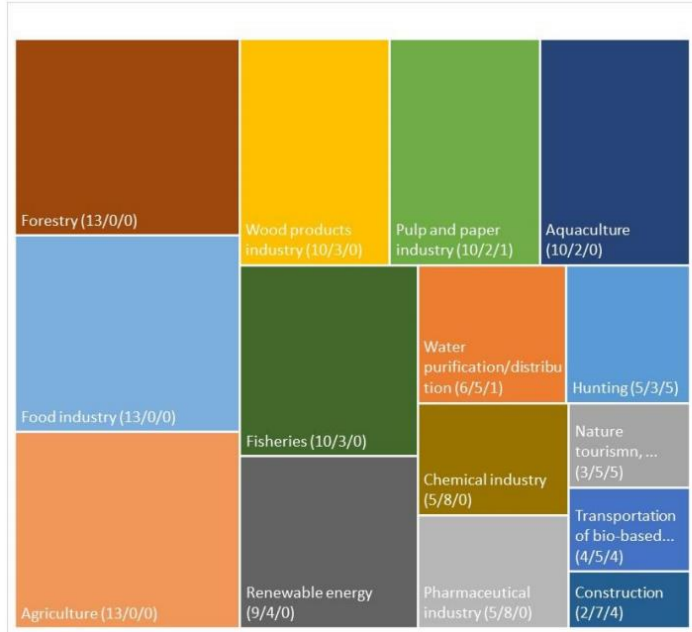


Figure 3 Hierarchical view on survey results on sum of industries and activities (“included”/“partly included”/“not included”) in the bioeconomy sector at national level. The bigger the sector box the higher the sum of countries including an industry and activity at national level. Sectors are defined in the *European Classification of Economic Activities* (NACE, Rev. 2).



Table 4. Industries and activities according to the *European Classification of Economic Activities* (NACE, Rev. 2) (included= “++”/ partly included = “+” /not included =“-”) in the bioeconomy sector at national level.

NACE category	DENMARK	ESTONIA	FINLAND	FRANCE	GERMANY	ITALY	LATVIA	NETHERLANDS	NORWAY	SLOVAKIA	SPAIN	TURKEY	UK
Agriculture	++	++	++	++	++	++	++	++	++	++	++	++	++
Aquaculture	++	++	++	++	++	++	++	+	++	+	++	++	++
Chemical industry	+	+	++	+	+	++	+	+	+	+	++	++	++
Construction	+	-	++	+	+	-	+	-	+	-	+	++	+
Fisheries	++	++	++	++	++	++	++	+	++	+	++	++	+
Food industry	++	++	++	++	++	++	++	++	++	++	++	++	++
Forestry	++	++	++	++	++	++	++	++	++	++	++	++	++
Hunting	+	++	++	-	+	-	++	-	++	+	-	++	-
Nature tourism, green care and recreation	+	++	++	+	-	-	+	-	+	-	+	++	-
Pharmaceutical industry	+	+	++	+	+	++	+	++	+	+	+	++	++
Pulp and paper industry	++	++	++	++	++	++	-	++	++	+	++	++	+
Renewable energy	+	++	++	+	+	++	++	++	++	++	++	++	+
Transportation of bio-based raw materials and products	+	++	++	++	+	-	-	+	+	-	++	-	+
Water purification and distribution	+	-	++	+	+	+	++	++	++	+	+	++	+
Wood products industry	++	++	++	++	++	++	++	+	++	+	++	+	++

Source [4]

Source [4]

Bioeconomy sectors in the EU MS

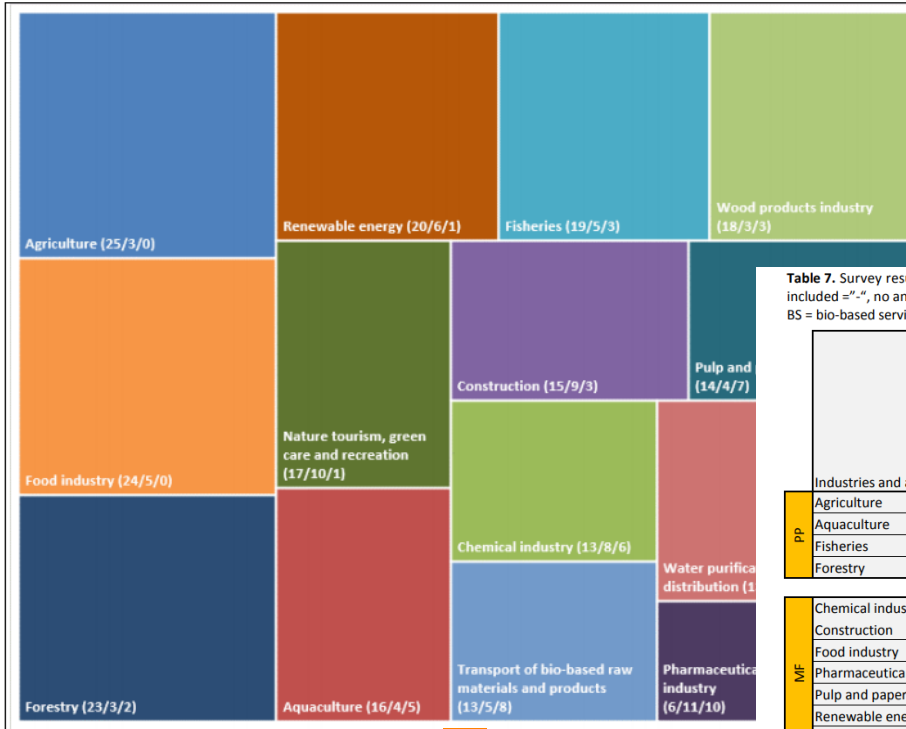


Figure 2. Hierarchical view on survey results on sum of industries and activities ("included"/"partly included"/"not included") in the bioeconomy sector at regional level. The bigger the sector box the higher the sum of countries including an industry and activity at regional level. Industries and activities are defined in the European Classification of Economic Activities (NACE, Rev. 2).

Regional

Source [2]

Table 7. Survey results on industries and activities according to the European Classification of Economic Activities (NACE, Rev. 2) (included="+" / partly included = "+*" / not included = "-"; no answer "na") in the bioeconomy sector at regional level. PP = primary producers of bio-based raw materials, MF = manufacturers of bio-based end-products, BS = bio-based services.

Industries and activities	Alto Tâmega (PT)	Campania (IT)	Castilla y León (ES)	Cataluña (ES)	Central Finland (FI)	Emilia-Romagna (IT)	Extremadura (ES)	Flanders (BE)	Friuli Venezia Giulia (IT)	Kainuu (FI)	Kalmar (SE)	Kymenlaakso (FI)	Lapland (FI)	Limburg (NL)	Murcia (ES)	North East (RO)	North Karelia (FI)	North Savo (FI)	Oulu Region (FI)	Pays de la Loire (FR)	Satakunta (FI)	South Holland (NL)	South Ostrobothnia (FI)	South Savo (FI)	Tuscany (IT)	Vidzeme (LV)	Värmland (SE)	Western Macedonia (GR)	SUM "Included"	SUM "Partly included"	SUM "Not included"								
PP																																							
Agriculture	+	++	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	25	3	0				
Aquaculture	+	na	++	++	-	+	++	++	++	++	++	++	++	+	-	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	16	4	5			
Fisheries	-	+	++	++	++	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	19	5	3			
Forestry	++	+	++	++	++	+	++	++	++	++	++	++	++	+	-	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	23	3	2			
MF																																							
Chemical industry	-	+	++	+	+	++	-	++	++	++	++	++	-	++	-	na	++	-	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	13	8	6		
Construction	-	+	++	+	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	15	9	3	
Food industry	+	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	24	4	0	
Pharmaceutical industry	-	+	++	++	++	-	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	6	11	10	
Pulp and paper industry	-	na	++	++	++	+	-	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	14	4	7	
Renewable energy	++	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	na	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	20	6	1	
Wood products industry	++	na	++	++	++	na	na	++	++	++	++	++	++	-	-	na	++	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	18	3	3		
BS																																							
Hunting	-	na	-	++	+	na	+	-	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	7	6	12	
Nature tourism, green care and recreation	+	+	++	+	+	++	-	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	17	10	1
Transport of bio-based raw materials and products	+	+	++	+	-	na	-	+	++	++	++	++	++	++	++	na	++	-	++	-	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	13	5	8	
Water purification and distribution	+	na	++	++	++	na	+	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	13	10	3	

Key socio-economic aspect of bioeconomy in EU MS

Table 3. Contribution of bioeconomy sectors to the total bioeconomy labour market, turnover and value added (%), EU-28, 2015.

Sector	Workers	Turnover	Value Added
Agriculture	51.0	16.8	28.0
Forestry	3.0	2.2	3.8
Fishing	1.2	0.5	1.1
Manufacture of food, beverages and tobacco	25.1	51.0	37.6
Manufacture of bio-based textiles	5.6	4.6	4.6
Manufacture of wood products and furniture	7.8	7.7	7.6
Manufacture of paper	3.6	8.3	7.3
Manufacture of bio-based chemicals, pharmaceuticals, plastics and rubber (excluding biofuels)	2.5	7.8	9.1
Manufacture of liquid biofuels	0.1	0.5	0.4
Production of bioelectricity	0.1	0.5	0.5

“Agriculture, being a low labour productive sector, employs 51% of bioeconomy workers but generates only 28% of the bioeconomy value added” Source [5]

“Over time, bioeconomy employment tends to reduce while value added increases....people working in the bioeconomy was 2.5 million fewer in 2015 than in 2008, mainly because of the ongoing restructuring of the agricultural sector” Source [5]

Source [5]

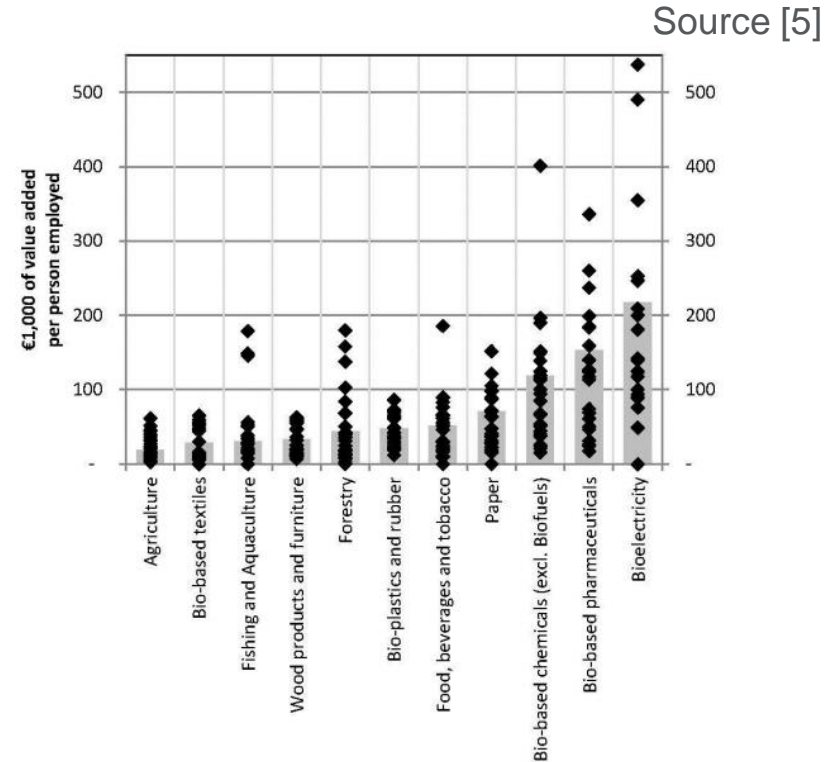
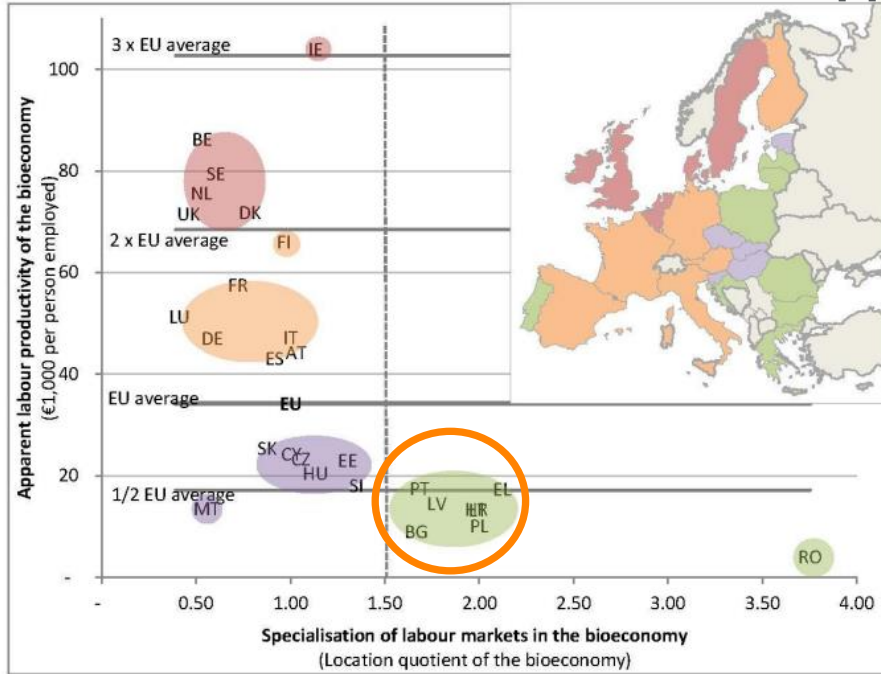


Figure 1. Sectoral apparent labour productivity in the EU-28 bioeconomy, 2015: bars show EU-28 apparent labour productivity; points show Member States' apparent labour productivity. Note that apparent labour productivity in Ireland for the manufacture of bio-based pharmaceutical is out of scale on this graph, reaching 784 k€ per person employed.

Bioeconomy in BIOEAST

Source [5]



“strong specialisation of national labour markets in the bioeconomy (location quotient higher than 1.6 in 2015) but a level of apparent labour productivity of the bioeconomy below half the EU-28 level”

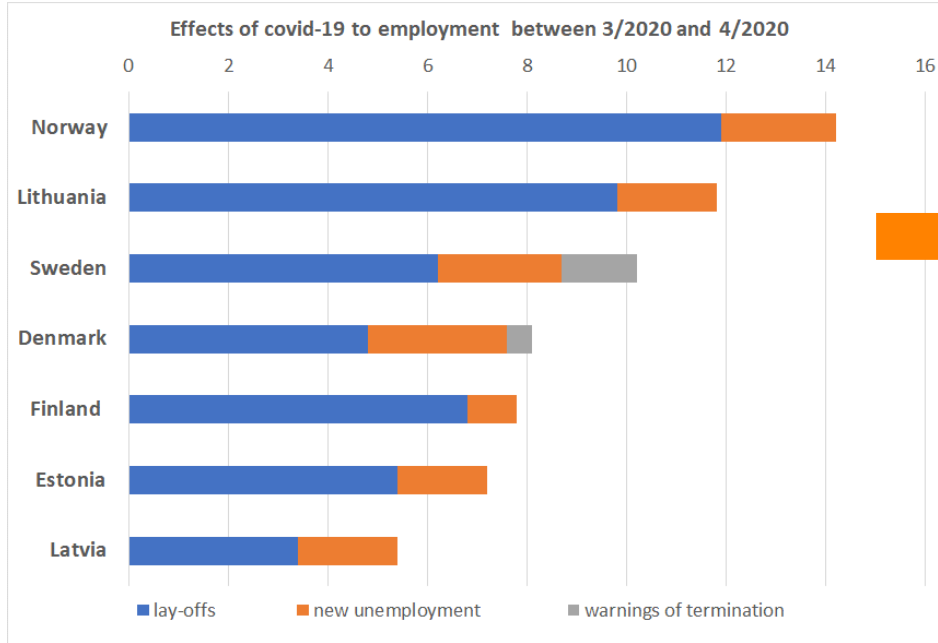
Source [5]

“develop knowledge and cooperation based circular bioeconomies, ... to enhance their inclusive growth and to create new value-added jobs especially in rural areas, maintaining or even strengthening environmental sustainability”

“should result in creating jobs, based on the introduction of new value-added processes in the primary production sectors, on **innovative solutions** and on the **development of new value chains in the processing sectors** – with a specific attention to the use of bio-based chemicals and material”

Source [6]

Bioeconomy and covid-19



Source [7]

“The key to revitalizing the euro area is the fiscal policy of the Member States ... most countries have reported significant support and recovery packages to mitigating the financial impact of the coronavirus, but for some particularly vulnerable countries the means of fiscal policy are limited” Source [8]

“should result in creating jobs, based on the introduction of new value-added processes in the primary production sectors, on innovative solutions and on the development of new value chains in the processing sectors – with a specific attention to the use of bio-based chemicals and material”

Source [6]

Output within BIOEASTsUP WP1

Bioeconomy sector analyses

- in-output analyses, current and future bioeconomy sectors

Short and long-term objectives for the development of a bioeconomy strategy

- country-specific, EU BES (2018) as base

Bioeconomy monitoring indicators

- country-specific indicator set

Results by 10/2020



Sources

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- [3] Implementation of the Finnish Bioeconomy Strategy. <https://www.bioeconomy.fi/implementation-of-the-finnish-bioeconomy-strategy/>
- [4] Lier, M.; Aarne, M.; Kärkkäinen, L.; Korhonen, K.T.; Yli-Viikari, A.; Packalen, T. Synthesis on Bioeconomy Monitoring Systems in the EU Member States—Indicators for Monitoring the Progress of Bioeconomy (MontBioeco); *Natural Resources and Bioeconomy Studies* 38/2018
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- [8] Handelsbanken. Talousennuste 29.4.2020.
- [9] Linser, S.; Lier, M. The Contribution of Sustainable Development Goals and Forest-Related Indicators to National Bioeconomy Progress Monitoring. *Sustainability* **2020**, *12*, 2898. <https://www.mdpi.com/2071-1050/12/7/2898>



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