

MontBioeco – Synthesis on bioeconomy monitoring systems in the EU Member States

- indicators for monitoring the progress of bioeconomy

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strategic working group under the



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1. Background MontBioeco

Pressure

- EC “will implement an EU-wide, internationally coherent monitoring system (Action 3.2) to track the progress towards a sustainable, circular bioeconomy in Europe and to underpin related policy areas. Knowledge gained will be used to provide voluntary guidance for operating the bioeconomy within safe ecological limits (Action 3.3)” (EU Updated Bioeconomy Strategy 2018)
- “The data and information generated in these actions will be made publicly available through the Knowledge Centre for Bioeconomy” (EU Updated Bioeconomy Strategy 2018)
 - => no commonly agreed set of indicators to measure the bioeconomy at EU level
- main drivers for transition towards a bioeconomy often vary between EU MS on country-specific economic and ecological settings, legal framework, and social demands; the national or regional bioeconomy strategies vary in their goals and measures

2. Aims, work plan and output

Response

- overview on country-specific bioeconomy settings
- screening and comparing different approaches within EU MS to monitor the progress in bioeconomy
- an outline of the most suitable key indicators and related indicators towards a common set of indicators

Work plan

WP1
Conducting desktop studies + expert input on most suitable bioeconomy key indicators and related indicators

Conducting online-survey on existing and needed bioeconomy key indicators and related indicators + data availability

WP2
Analysing the online survey results

WP3
Outline for consistent approach of a bioeconomy monitoring system

End-users of the final report

- National level
- EU policy processes
- General public

Milestones and outputs

Survey on monitoring in the EU MS send to SCAR and BSW members
12/2017

Results of the questionnaire
3/2018

First preliminary report ready for discussion in BSW
4/2018

Final report on suitable key and related indicators and their respective data availability
6/2018

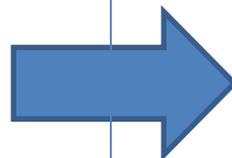
3. Methods and material

- *indicator > valid and meaningful, fits under a policy, easy to understand, measurable (and has a good data coverage)*

WP1

Conducting desktop studies + expert input on most suitable bioeconomy key indicators and related indicators

Conducting online-survey on existing and needed bioeconomy key indicators and related indicators + data availability



Online survey + glossary send to SCAR BSW members in 21 countries 12/2017 > 9 country responses by 1/2018 > 13 country responses by 4/2018 > revision of the provided answers by countries in a second round (clarification of unsolved issues via phone discussions)

EU bioeconomy strategy objective	Number of identified key indicators	Number of identified related indicators
Creating jobs and maintaining competitiveness	5	90
Reducing dependence on non-renewable resources	6	15
Mitigating and adapting climate change	6	8
Ensuring food security	7	22
Managing natural resources sustainably	5	26
SUM	29	161

Country	Main respondent and other organisations involved in answering the survey
Denmark	Ministry of Environment, Food and Ministry of Higher Education and Science
Estonia	Ministry of Rural Affairs
Finland	Ministry of Agriculture and Forestry
France	Ministry of Agriculture and Food (main correspondent), ACTA, ADEME, AFB, ANR, AXELERA, CITEPA, FAM, IAR, INRA, IRSTEA, MAA, Ministry of Ecology, Ministry of Industry, Ministry of Research, TENERRDIS
Germany	Federal Ministry of Education and Research (main correspondent), Projektträger Jülich (PtJ), Forschungszentrum Jülich GmbH
Italy	CREA-PB (main respondent), Ministry of Agricultural, Food and Forestry Policies, Research and experimentation Office - DISR IV
Latvia	Ministry of Agriculture
Netherlands	Ministry of Agriculture, Nature and Food Quality
Norway	Research Council of Norway
Slovakia	Bioeconomy Cluster
Spain	Spanish National Institute for Agricultural and Food Research and Technology (INIA)
Turkey	Ministry of Food, Agriculture and Livestock
UK	Knowledge Transfer Network (main correspondent), Department Business Energy and Industrial Strategy, AgriFood and Biosciences Institute, Department Environment, Food and Rural Affairs

4. Results: Existing bioeconomy strategies/policies and/or related initiatives, existing monitoring activities and sectors included in a bioeconomy at national level (updated)

	Finland	Turkey	Belgium (Fland.)	Estonia	Norway	Spain	Italy	France	Latvia	Germany	Denmark	Netherlands	UK	Slovakia
Bioeconomy strategy, policy and/or related initiatives (++) , under development (+)	++	+	++	+	++	++	++	++	++	++	++	++	+	++
Indicators to monitor and assess bioeconomy strategy, policy and/or related initiatives (++) , under development (+), currently not under development (-)	++	-	+	-	-	++	++	+	++	+	-	+	+	-
Industries and activities	Finland	Turkey	Belgium (Fland.)	Estonia	Norway	Spain	Italy	France	Latvia	Germany	Denmark	Netherlands	UK	Slovakia
Agriculture	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Food industry	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Forestry	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Aquaculture	++	++	++	++	++	++	++	++	++	++	++	+	++	+
Fisheries	++	++	++	++	++	++	++	++	++	++	++	+	+	+
Pulp and paper industry	++	++	++	++	++	++	++	++	-	++	++	++	+	+
Wood products industry	++	+	++	++	++	++	++	++	++	++	++	+	++	+
Renewable energy	++	++	++	++	++	++	++	+	++	+	+	++	+	++
Chemical industry	++	++	++	+	+	++	++	+	+	+	+	+	++	+
Hunting	++	++	-	++	++	-	-	-	++	+	+	-	-	+
Pharmaceutical industry	++	++	++	+	+	+	++	+	+	+	+	++	++	+
Water purification and distribution	++	++	++	-	++	+	+	+	++	+	+	++	+	+
Transportation of bio-based raw materials and products	++	-	-	++	+	++	-	++	-	+	+	+	+	-
Nature tourism, green care and recreation	++	++	+	++	+	+	-	+	+	-	+	-	-	-
Construction	++	++	++	-	+	+	-	+	+	+	+	-	+	-

Existing bioeconomy strategy, policy and/or related initiatives. Existing indicators to monitor and assess bioeconomy strategy, policy and/or related initiatives. Results on 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. Source: Lier et al. 2018. Synthesis on bioeconomy monitoring systems in the EU Member States – indicators for monitoring the progress of bioeconomy. Natural resources and bioeconomy studies 38/2018. 44 p. Natural Resources Institute Finland, Helsinki 2018. Information for Belgium received after the publication.

4. Results

Traditional sectors part of the bioeconomy sector

- aquaculture, fisheries, food industry, agriculture, forestry considered as part of the bioeconomy sector; transport, water purification and distribution and construction considered partly or not part of the bioeconomy; share of bio-based in pharmaceutical industry and chemical industry processes difficult to calculate

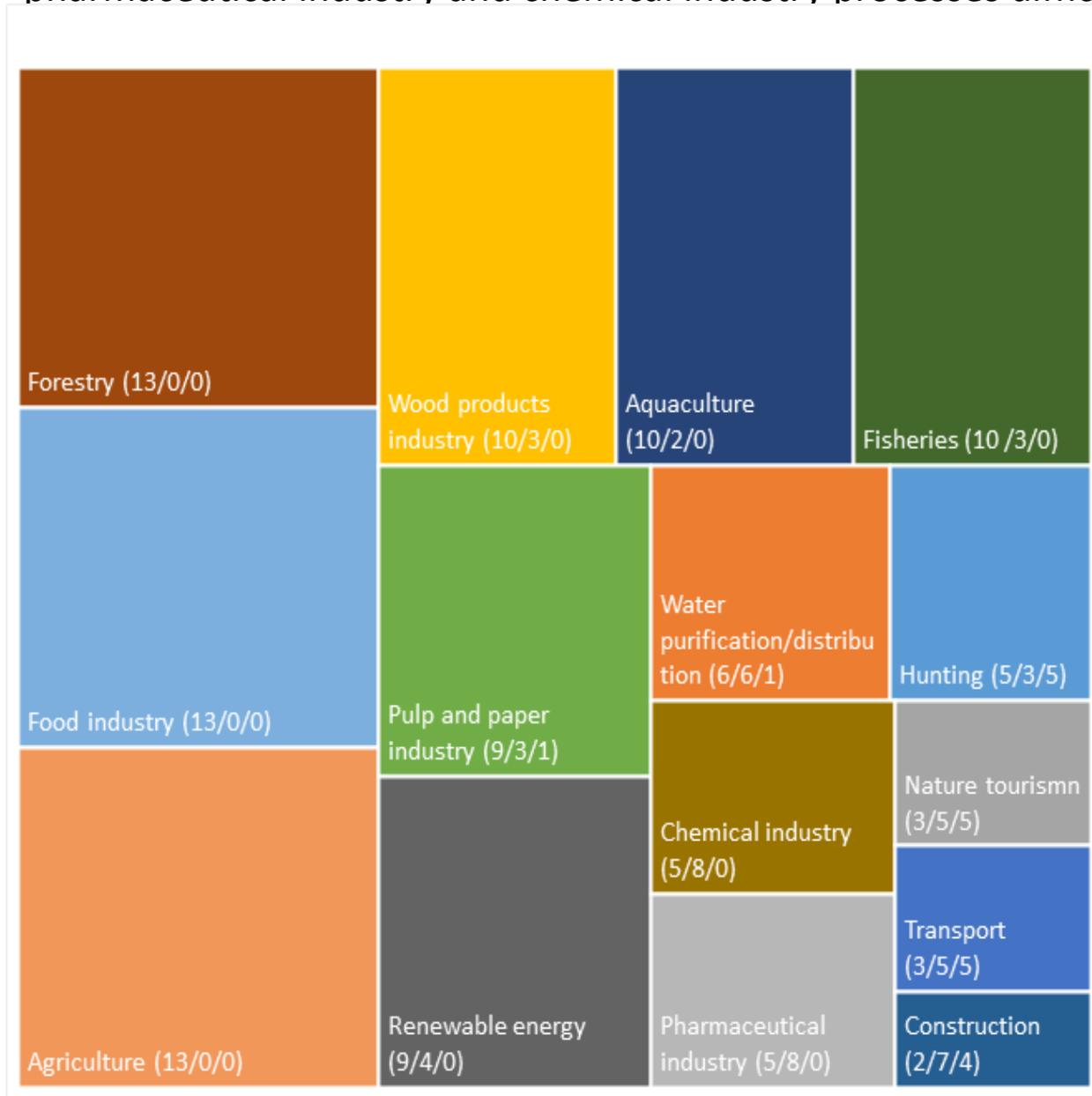


Table 2 Industries and activities according to the *European Classification of Economic Activities (NACE, Rev. 2)* (included= “++” / partly included = “+” /not included =“-”) in the bioeconomy sector at national level.

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	++	++	++	++	++	++	++	+	++	+	++	+	++

Figure 2 Hierarchical view on survey results on sum of industries and activities (“includ-ed”/”partly includ-ed”/”not included”) in the bioeconomy sector at national level. The bigger the sector box the higher the sum of coun-tries including an indus-try and activity at nation-al level. Sectors are de-fined in the European Classification of Econom-ic Activities (NACE, Rev. 2).

4. Results – Objective “Creating jobs and maintaining competitiveness”

- country specific social-economic and ecological settings are well reflected in the responses

Table 5. Results of the online-survey on existing and needed bioeconomy key indicators and related indicators, as well as their respective data availability, under the bioeconomy objective “Creating jobs and maintaining competitiveness”.

Bioeconomy key indicators and related indicators as identified under the bioeconomy objective “Creating jobs and maintaining competitiveness”	Key indicator	Related indicator	Demand			Supply
			SUM countries that answered “included” at national level	SUM countries that answered “not included, but needed” at national level	SUM countries that answered “not needed”	Data availability in countries
1.1 Number of employed persons in rural and urban areas (1000 persons)	x		8	0	0	8
1.1.1 Food sector		x	7	1	1	8
1.1.1.1 Agriculture		x	7	1	1	
1.1.1.2 Food industry		x	8	1	1	
1.1.1.3 Aquaculture		x	7	2	1	
1.1.2 Bioeconomy goods		x	9	1	0	
1.1.2.1 Forestry		x	8	1	1	
1.1.2.2 Wood products industry		x	6	3	1	
1.1.2.3 Pulp and paper industry		x	4	4	2	
1.1.2.4 Construction		x	5	2	3	
1.1.2.5 Chemical industry		x	6	3	1	
1.1.2.6 Pharmaceutical industry		x	5	4	1	
1.1.3 Renewable energy		x	4	5	0	
1.1.4 Water purification and distribution		x	3	4	2	
1.1.5 Transportation of bio-based raw materials/products		x	1	6	3	
1.1.6 Bioeconomy services		x	3	5	1	
1.1.6.1 Nature tourism, green care and recreation		x	2	5	2	
1.1.6.2 Hunting		x	2	4	4	
1.1.6.3 Fisheries		x	4	3	2	
1.2. Value added (1000 EUR)		x				10
1.2.1 Food sector		x	9	1	0	10
1.2.1.1 Agriculture		x	9	1	0	9
1.2.1.2 Food industry		x	9	1	0	9
1.2.1.3 Aquaculture		x	5	3	1	6
1.2.2 Bioeconomy goods		x	6	3	0	6
1.2.2.1 Forestry		x	6	3	0	7
1.2.2.2 Wood products industry		x	6	2	1	7
1.2.2.3 Pulp and paper industry		x	4	4	1	4
1.2.2.4 Construction		x	4	3	2	7
1.2.2.5 Chemical industry		x	6	3	0	6
1.2.2.6 Pharmaceutical industry		x	5	4	0	7
1.3. Contribution to the GDP (%)		x				5
1.3.1 Food sector		x	7	2	0	7
1.3.1.1 Agriculture		x	5	3	0	6
1.3.1.2 Food industry		x	6	2	0	5
1.3.1.3 Aquaculture		x	6	2	0	5
1.3.2 Bioeconomy goods		x	6	3	0	4
1.3.2.1 Forestry		x	5	3	0	5
1.3.2.2 Wood products industry		x	4	3	1	4
1.3.2.3 Pulp and paper industry		x	5	3	0	4
1.3.2.4 Construction		x	2	3	2	5
1.3.2.5 Chemical industry		x	6	3	1	5
1.3.2.6 Pharmaceutical industry		x	5	3	0	6
1.3.3 Renewable energy		x	6	3	1	5
1.3.4 Water purification and distribution		x	1	3	4	4
1.3.5 Transportation of bio-based raw materials/products		x	2	4	3	3
1.3.6 Bioeconomy services		x	3	4	2	1
1.3.6.1 Nature tourism, green care and recreation		x	1	3	3	0
1.3.6.2 Hunting		x	2	1	4	0
1.3.6.3 Fisheries		x	4	2	1	2

5. Discussion – most suitable identified key indicators

EU bioeconomy strategy objective	Identified most suitable key indicators
Creating jobs and maintaining competitiveness	Number of employed persons in rural and urban areas
	Value added
	Contribution to the GDP
	Investment in research and innovation
	Exports
	+ Import (identified by the correspondents after the online-survey)
Reducing dependence on non-renewable resources	Production of renewable energy and Production of biofuels and biogas combined
	Material and waste recycling and recovery rates
	Material replacing non-renewable resources
	Public financial support and private
	Investment in research and innovation
Mitigating and adapting climate change	Carbon sequestration
	Forest carbon emissions/sinks
	Greenhouse gas emissions from agriculture
	Water area carbon emissions/sinks
	Public financial support and private investments
	Investment in research and innovation
Ensuring food security	Domestic food supply of food commodities in terms of production, import/ stock change
	Agricultural products
	Fish products
	Non-wood forest products
	New food products
	Public financial support and private
	Investment in research and innovation
Managing natural resources sustainably	Land cover
	Resource availability
	Sustainable resource use
	Environmental protection
	Public financial support and private investments for ecosystem services
	+ Investment in research and innovation (identified by the correspondents after the online-survey)

6. Conclusion

- identified most suitable bioeconomy key indicators important and feasible at the national context, can **contribute to the further discussions when setting the frame for the development of a common EU bioeconomy monitoring system**
 - **regional context**
- to reach consistent and comparable country (regions) results across all EU MS, **standardized statistical sources need to be utilized** when reporting data under the most suitable key indicators and related indicators
- the proposed indicator set needs to be further developed, **including several rounds of testing their feasibility**
- to **avoid an overlapping** in the development of bioeconomy monitoring ,co-operation is needed between EU MS and actors active in this field, such as the EC, Eurostat, FAO, FOREST EUROPE, and the JRC Knowledge Centre Bioeconomy

MontBioeco –

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- indicators for monitoring the progress of bioeconomy

Community of practice workshop on setting the scene for monitoring the economic, environmental and social progress of the EU bioeconomy

21 November 2018

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DIABOLO has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 633464. Project duration: 1.3.2015–28.2.2019. Coordinator: Natural Resources Institute Finland (Luke)



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