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

**- indicators for monitoring the progress of bioeconomy**

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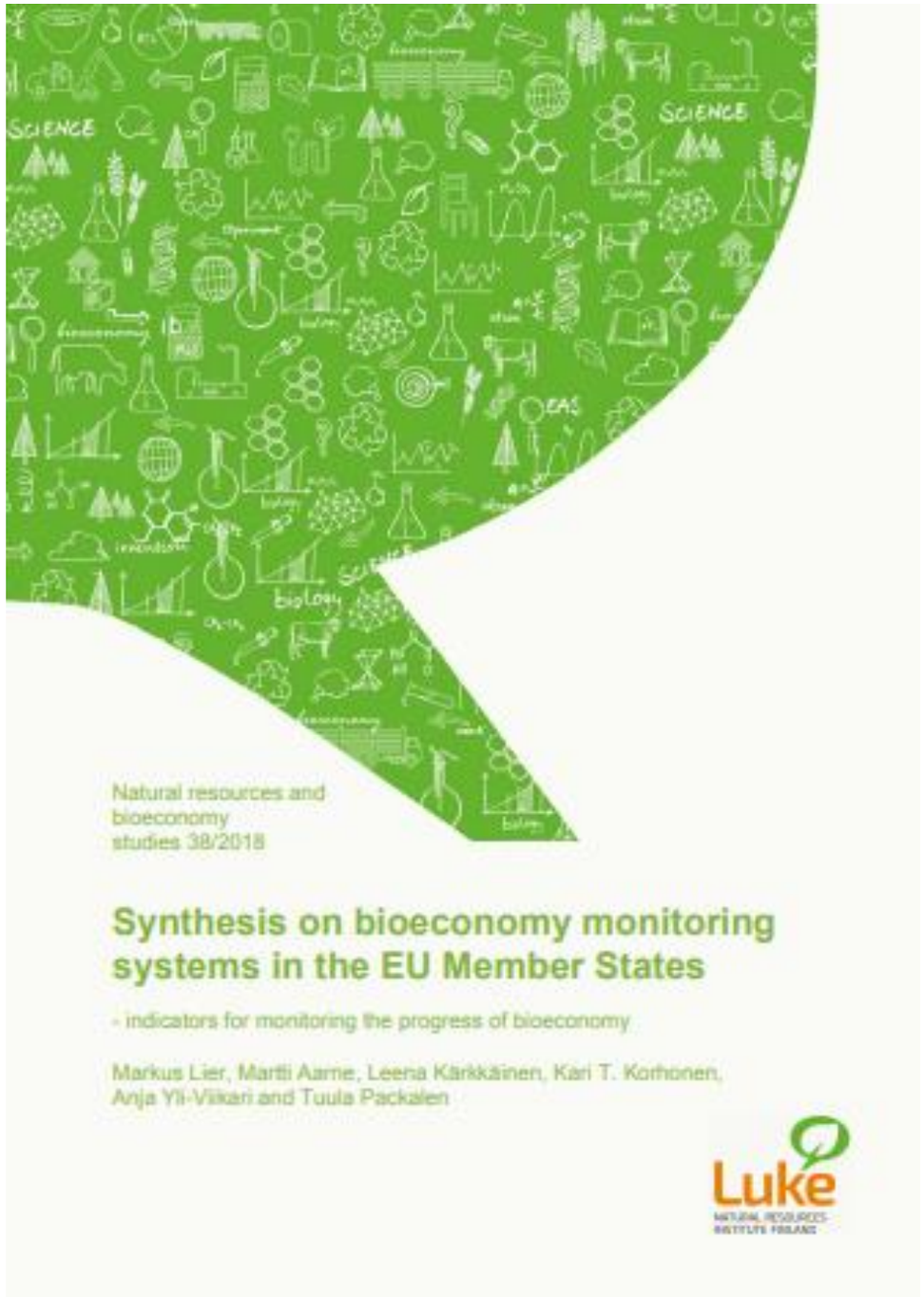
# LINK TO THE PUBLICATION




Lier, M., Aarne, M., Kärkkäinen, L., Korhonen, K.T., Yli-Viikari, A. and Packalen, T. (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. Read the full report under this LINK http://jukuri.luke.fi/bitstream/handle/10024/542249/luke-luobio_38_2018.pdf?sequence=5&isAllowed=y

# 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)

- 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**

- **no commonly agreed set of indicators** to measure the bioeconomy

# 2. MONTBIOECO - 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 bioeceonomy key indicators and related indicators**

**Conducting online-survey on existing and needed bioeceonomy 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. RESULTS:** Existing bioeconomy strategies/policies and/or related initiatives, existing monitoring activities and sectors included in a bioeconomy at national level (updated)

| | Finland | Estonia | 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 (-) | ++ | - | ++ | ++ | + | ++ | + | - | + | + | - |

| **Land cover as % of total land area** | Finland | Estonia | Spain | Italy | France | Latvia | Germany | Denmark | Netherlands | UK | Slovakia |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Agricultural area including grassland | 8,6 | 32,5 | 53,6 | 56,9 | 61,4 | 41,8 | 57,6 | 76,7 | 65,8 | 62,2 | 48,0 |
| Forest area | 71,3 | 55,7 | 27,0 | 29,9 | 28,4 | 51,5 | 31,0 | 11,0 | 8,4 | 9,7 | 44,8 |
| Artificial area* | 1,4 | 2,2 | 2,6 | 5,3 | 5,6 | 2,0 | 9,4 | 7,6 | 14,2 | 8,4 | 5,9 |
| Sea and inland waters | 8,2 | 4,8 | 0,8 | 1,1 | 0,9 | 2,0 | 1,3 | 2,2 | 8,9 | 1,4 | 0,7 |
| Other | 10,5 | 4,8 | 16,0 | 6,8 | 3,7 | 2,7 | 0,7 | 2,5 | 2,7 | 18,3 | 0,6 |

| **Bioeconomy industries and activities** | Finland | Estonia | 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 | ++ | - | + | - | + | + | + | + | - | + | - |

Table: 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. Data for Land cover as % of total land area: EC (2017) CAP context indicators 2014-2020. Forest area including transitional woodland-shrub. Artifical*: Urban fabric; industrial, commercial and transport units; mine, dump and construction sites; artificial, non-agricultural vegetated areas.

# 3. 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 | 0 | 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 | | 6 | 3 | 0 | 8 | 5 |
| 1.3.1 Food sector | | x | 7 | 2 | 0 | 7 | 4 |
| 1.3.1.1 Agriculture | | x | 5 | 3 | 0 | 6 | 3 |
| 1.3.1.2 Food industry | | x | 6 | 2 | 0 | 5 | 2 |
| 1.3.1.3 Aquaculture | | x | 6 | 2 | 0 | 5 | 1 |
| 1.3.2 Bioeconomy goods | | x | 6 | 3 | 0 | 4 | 2 |
| 1.3.2.1 Forestry | | x | 5 | 3 | 0 | 5 | 3 |
| 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 | |

# 4. Discussion – most suitable identifed 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/ sto 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) |

## 5. 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 as next step**

- 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

*Kiitos!*

*Grazie!*