



D3.1 - HANDBOOK ON POLICY MONITORING SYSTEM AND KEY PERFORMANCE INDICATORS

VERSION 2, MARCH 2025



The project has received funding from the European Union's Horizon 2020 research and innovation program under Grant Agreement N°101060476.



Project title	Supporting the establishment of the innovative governance models to achieve better informed decision-making processes, social engagement and innovation in the bio-based economy.		
Project acronym	BIOMODEL4REGIONS		
Grant Agreement	101060476		
Project start date	01/07/2022	Duration	36 months

D3.1 - Handbook on policy monitoring system and key performance indicators

Due date	31.10.2023	Delivery date	Updated delivered on 18.03.25
Work package	3		
Responsible Author(s)	Myrna van Leeuwen (Wageningen Research)		
Contributor(s)	Nikolai Jacobi, Monika Heyder, Leah Lazer (ICLEI Europe)		
Version	2		

Dissemination level

Please select only one option according to the GA			
☒	PU: Public	☐	PP: Restricted to other program participants
☐	RE: Restricted to a group specified by the consortium	☐	CO: Confidential, only for members of the consortium

Version and amendments history

Version	Date (MM/DD/YYYY)	Created/Amended by	Changes
0.1	July 23	WR	
0.2	18 October 23	ICLEI	
0.3	24 October 23	WR	
0.4	30 October 23	ICLEI	
1	31 October 23	WR	
2	18 March 2025	ICLEI	Updated based on completed regional governance analysis

Table of Contents

1	INTRODUCTION.....	6
2	GENERIC BIOECONOMY GOVERNANCE ASSESSMENT FRAMEWORK	7
2.1	GOVERNANCE FRAMEWORK.....	7
2.2	KEY PERFORMANCE INDICATORS.....	11
2.2.1	Profile indicators.....	12
2.2.2	Governance indicators	13
	Indicator: Presence of cluster organization.....	13
	Indicator: Collaboration in H2020, CBI-JU, HORIZON projects	13
	Indicator: Collaboration in macro-regional projects	14
	Indicator: Bio-cluster integrated in science park.....	15
	Indicator: Campaigns/events to raise awareness on bio-based economy	15
	Indicator: Public support and acceptance.....	16
	Indicator: Monitoring and reporting on the bio-based economy	16
	Indicator: Certification and labels for BBPs.....	17
	Indicator: Share of companies with sustainability credentials	17
	Indicator: Existence of Inter-ministerial cooperation to develop regional bioeconomy.....	18
	Indicator: Intensity of inter-ministerial forums.....	18
	Indicator: Existence of inter-regional cooperation to develop regional bioeconomy ..	19
	Indicator: number of inter-regional forums.....	19
	Indicator: Bio-based public procurement policy	20
	Indicator: Policy incentives (tax, subsidies) supporting demand of bio-based products	20
	Indicator: Binding international laws & regulations (supporting bio-based economy)	20
	Indicator: Binding international laws & regulations (obstacle for bio-based economy)	21
	Indicator: Successful transposition of European laws and regulations that link to bio-based economy	21
	Indicator: Trade policies (supporting bio-based economy)	22
	Indicator: Trade policies (obstacles for bio-based economy)	22
	Indicator: Policy regulations in place (supporting for bio-based economy)	23
	Indicator: Policy regulations in place (obstacles for bio-based economy).....	23
	Indicator: Dedicated regional bioeconomy strategies	24
	Indicator: Regional strategies with links to bioeconomy and bio-based economy	24
	Indicator: Number of government departments and agencies involved in bioeconomy strategy roll-out/implementation.....	25

Indicator: Policy commitment to bioeconomy and bio-based economy strategy implementation through in media.....	25
Indicator: Access to private funds used by the biobased companies.....	26
Indicator: Access to public funds used by biobased companies.....	26
Indicator: Presence of incubator	27
Indicator: Regional guidance on sustainability practices for bio-based economy sector	27
Indicator: R&D expenditure per capita.....	28
Indicator: Pilot and Demonstration facilities	28
Indicator: Intellectual property rights	29
Indicator: Level playing field	29
Indicator: Licensing new permits indirectly linked to BBPs (e.g. building permits).....	29
Indicator: Licensing new permits directly linked to BBPs	30
Indicator: Existence of good practices for developing regional bioeconomy	30
Indicator: Pre-school education programs	31
Indicator: Primary education programs.....	31
Indicator: Secondary education programs	32
Indicator: Tertiary and vocational education programs	32
Indicator: Presence of human capital agenda.....	32
Indicator: Agricultural biomass production per capita	33
Indicator: Blue biomass production per capita	33
Indicator: Forestry biomass production per capita.....	34
Indicator: Waste biomass production per capita	34
Indicator: Emissions intensity of bio-based industry	35
2.2.3 Benchmarking	35
3 SELF-ASSESSMENT TOOL FOR REGIONAL BIOECONOMY GOVERNANCE	35
3.1 'INSTRUCTION' TAB	36
3.2 'FILL INDICATOR VALUES' TAB	37
3.3 'DASHBOARD' TAB	39
4 ONLINE BERST DASHBOARD WITH GOVERNANCE INDICATORS.....	43
4.1 BACKGROUND VISUALISATION.....	43
4.2 GOVERNANCE MODELS OF SIX BIOMODEL4REGIONS REGIONS.....	43
4.3 GOVERNANCE SELF-ASSESSMENT DATA FOR OTHER REGIONS	53
REFERENCES	55
ANNEX I GOVERNANCE KEY PERFORMANCE INDICATORS.....	56
ANNEX 2 META INFORMATION ON GOVERNANCE INDICATORS.....	59

ANNEX 3 DATA COLLECTION AT REGIONAL LEVEL	67
ANNEX 4 FEATURES ONLINE BERST DASHBOARD	69
A4.1 BERST DASHBOARD AT THE START OF BioMODEL4REGIONS PROJECT.....	69
A4.2. BERST GOVERNANCE DASHBOARD CREATED IN BioMODEL4REGIONS PROJECT.....	73

List of Abbreviations

BBP	Bio-based products
CS	Case studies
EU	European Union
EC-JRC	Joint Research Centre of the European Commission
G-SAT	Governance Self-Assessment Tool
KPI	Key Performance Indicator
NACE	Nomenclature statistique des Activités économiques dans la Communauté Européenne
NUTS	Nomenclature of territorial units for statistics
BERST	BioEconomy Regional Strategy Toolkit
OFMSW	Organic fraction of municipal solid waste

1 INTRODUCTION

The BIOMODEL4REGIONS project aims to support the establishment of innovative governance models at local/regional level to achieve better-informed decision-making processes, social engagement and innovation to support and strengthen EU and international science-policy interfaces to achieve the Sustainable Development Goals. This is achieved by supporting the development of regional/local strategies, aiming at exploiting local potentials and innovations by integrating the opportunities created by the local bio-based economy. This approach emphasizes the role of regional bio-based economy governance systems and related policies for contributing to the broader bio-based economy transition. The BIOMODEL4REGIONS project validates the performance of the regional governance systems with stakeholders from six pilot regions. These pilots differ in terms of geographic location, conditions and assets, and dependence on forestry, agri-food, aquatic biomass and organic fraction of municipal solid waste (OFMSW). They are the following:

- Normandy Region (France)
- Delta Region Southwest (The Netherlands)
- Nitra Region (Slovakia)
- North Swedish Region (Regions Västerbotten, Jämtland and Norrbotten, Västernorrland) (Sweden)
- Western Macedonia Region (Greece)
- Tuscany Region (Italy)

A robust regional governance framework is a precondition for any region that takes the bio-based economy as a pathway to reduce dependence on natural resources, transform manufacturing, promote sustainable production of renewable resources from land, fisheries and aquaculture and their conversion into food, feed, fibre, bio-based products and bio-energy, while growing new jobs and industries (EC Horizon, 2020). Such a framework supports policy analysis and enables the monitoring and benchmarking of regions. It also strengthens the development of recommendations for how to achieve improved bio-based economy governance in regions.

This Handbook outlines a generic framework to assess the governance of the bioeconomy in EU regions. The framework aims to give insight in pathways for “good governance” on the bioeconomy, including generic and specific governance functions, assessment criteria and a set of profile- and governance indicators (KPIs).

The Handbook provides guidance on the data collection process for any regional/subnational authority or (bioeconomy) cluster organization that is interested in self-assessing the current status of its regional governance performance and identifying possible hotspots for improvement. The set of key profile and governance indicators (Chapter 2) form the basis of the Excel-based **Governance Self-Assessment Tool** (G-SAT) that accompanies this Handbook and can be downloaded from [Online BERST dashboard on Governance](#).

2 GENERIC BIOECONOMY GOVERNANCE ASSESSMENT FRAMEWORK

2.1 GOVERNANCE FRAMEWORK

The basis of the governance model analysis in BIOMODEL4REGIONS is a generic hybrid framework with a set of assessment criteria and indicators. The framework is built upon three tiers, covering basic and specific (bioeconomy) governance functions as well as assessment criteria. The principal aim of the generic framework is to self-assess the status-quo at sub-national level (municipality or region) with regard to bioeconomy governance, i.e., more specifically, with regard to exchange of information, the setting of rules and regulations and the availability of funding and biomass feedstock for successful implementation (1st tier).

The generic assessment framework and indicators sets (Table 2-1) were tested with the six pilot regions in the BIOMODEL4REGIONS project and further developed considering the lessons learned from those applications.

Table 2-1 General assessment framework-basic governance and specific bioeconomy governance functions

Governance function (1 st tier)	Bioeconomy governance functions (2 nd tier)	Description
1 INFORMATION-SHARING	1.1 Consultation/collaboration/information flow across actors	Denotes consultations or other collaboration processes as well as formalized flows of information on bioeconomy topics (e.g., between regional governments, cluster organizations, knowledge provider and consumers/the public).
	1.2 Accountability/transparency, certification & award schemes	Includes monitoring and reporting practices (e.g., between government agencies) and certification/award schemes for labelling or otherwise incentivizing BPPs (e.g. BB-content labelling, carbon foot printing etc.).
	1.3 Coordination, cooperation and multi-level governance	Denotes formalized coordination mechanisms as well as horizontal (inner or inter-departmental topical governance) and vertical collaboration (multi-level governance).
2 RULE-SETTING	2.1 (Regional) Policy incentives	This includes any public levers exercises to incentivize production of BBPs, such as taxes, subsidies, or Green Public Procurement (GPP).
	2.2 (Regional) Policy regulation	This includes regional regulatory policies or adoption/implementation of related national or EU policies (e.g., on waste, agriculture, forestry or trade)
	2.3 (Regional) Strategy and horizontal linkages	Denotes governance instruments related to vision creation, the setting of principal development directions, such as e.g., circular bioeconomy strategies.
3 IMPLEMENTATION & FINANCE	3.1 Finance & investment	Focuses on the availability of public or private funding for bioeconomy innovations, project development and up-scaling/commercialization.
	3.2 Innovation, employment & value added	Includes status-quo assessments related to support mechanisms for

		innovation, education, bio-based employment and value added in sectors.
	3.3 Biomass availability and greenhouse gas emissions	Includes status-quo assessment on biomass availability (material flows) and greenhouse gas emissions intensity

The development of this *hybrid* assessment framework is based on a *virtual region approach*, aiming to derive generalizable relationships between a set group of actors in a normative way, creating an abstract, stylized depiction of bio-based economy governance that can be applied to the local context. It is *hybrid* in the way that it is based on both literature review of sustainability governance principle and functions (see Andonova et al., 2009; Adr  azola et al., 2018; J  nnicke et al. 2015) and expert judgement and co-creation. It further aims to recognize and use where possible principles or viewpoints of *society-nature relations* (Haberl et al., 2016) by framing a bio-based economy governance as the key macro-economic and behavioural system that defines those relationships, operating at the overlapping sphere of nature and human society (cf. Pauliuk et al., 2017).

To ensure its suitability for the project's pilot regions, the model has been aligned where possible and sensible to the governance structure established in the six pilot regions of the BioModels4Regions project.

To further advance the methodology development based on initial desktop research and process design, a 'participatory modelling' approach was selected. Participatory modelling is understood as a "purposeful learning process for action that engages the implicit and explicit knowledge of stakeholders to create formalised and shared representations of reality", in this case a representative model on the governance of bio-based economy in respective regions of the EU (Voinov et al., 2018). The primary aim of the participatory modelling exercise, implemented through focus group events as part of the BIOMODEL4REGIONS project, was to validate what had already been developed as well as to co-create parts of the methodology.

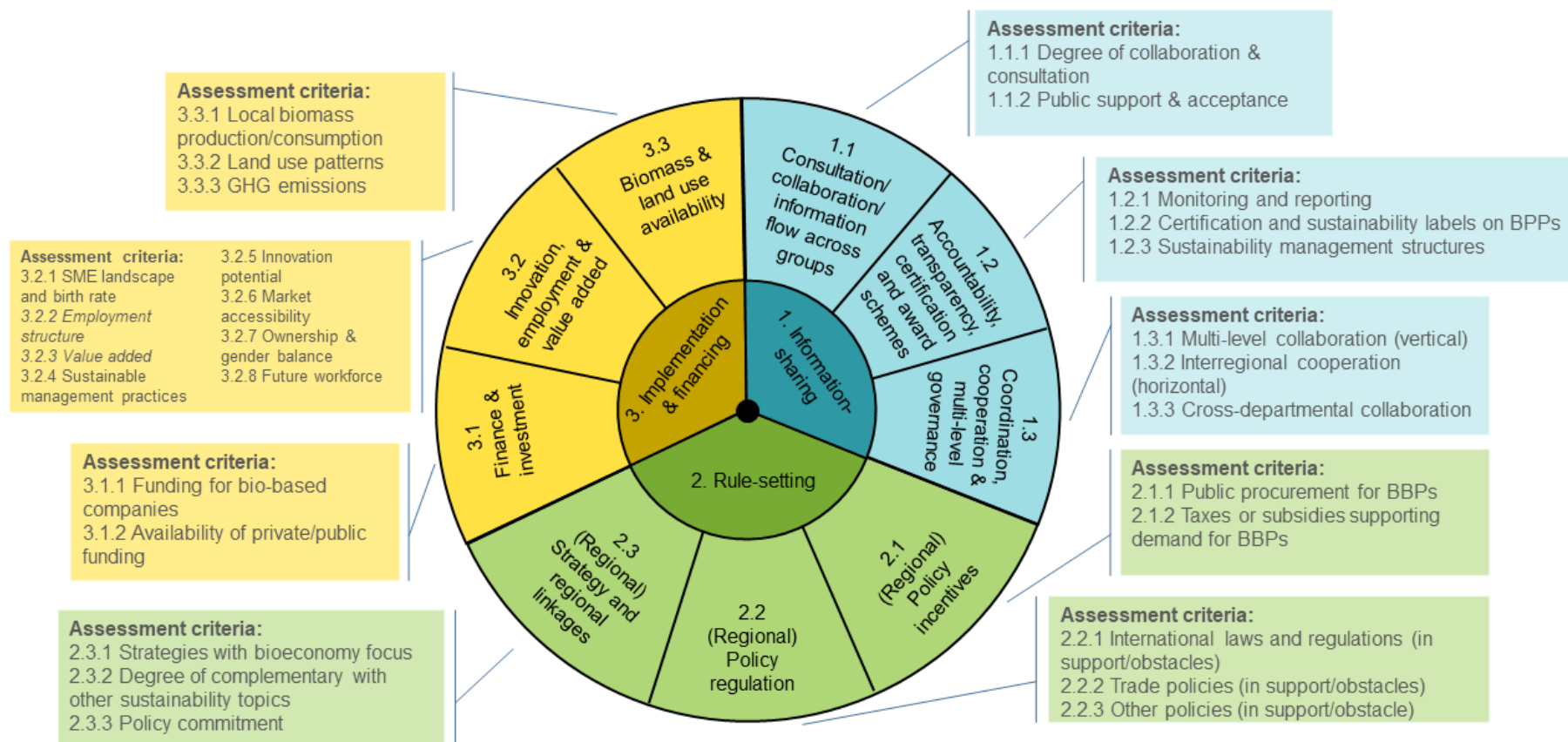


Figure 1: Generic bioeconomy governance assessment framework

The 3rd tier of the framework (see Figure 1) involves deriving a number of assessment criteria per 2nd tier function, describing key governance areas, which good practices/performance is being assessed (Table 2-2).

Table 2-2 Generic assessment framework – specific bioeconomy governance functions and assessment criteria

Bioeconomy governance functions (2 nd tier)	Assessment criteria (3 rd tier)	Description/ rationale
1.1 CONSULTATION/ COLLABORATION/ INFORMATION FLOW ACROSS ACTORS	1.1.1 Degree of collaboration & consultation	Describes the frequency, degree of formalization, or depth of collaboration between quadruple helix stakeholder relevant for the bioeconomy in the region
	1.1.2 Public support & acceptance	Relates to the degree of public awareness about the bioeconomy/ BBPs and related projects or initiatives support by related campaigns or events.
1.2 ACCOUNTABILITY/ TRANSPARENCY, CERTIFICATION & AWARD SCHEMES	1.2.1 Monitoring and reporting	Refers to monitoring and reporting schemes on the bioeconomy that are deployed by the local/regional/national government to promote transparency and accountability for set targets.
	1.2.2 Certification and sustainability labels on BBPs	Relates to existing certification schemes and labelling practices prevalent in the region (or the country) that are supporting the awareness raising on BBPs as their further penetration into the market.
1.3 COORDINATION, COOPERATION AND MULTI-LEVEL GOVERNANCE	1.3.1 Multi-level collaboration (vertical)	Denotes the degree of collaboration / exchange on the bioeconomy between different government levels (local, regional, national EU).
	1.3.2 Interregional cooperation (horizontal)	Refers to cooperation mechanisms related to bioeconomy governance between ministries or agencies across different regions, municipalities or counties.
	1.3.3 Cross-departmental (inner-regional) collaboration	Refers to the degree of cross-departmental collaboration across the regional government (e.g., between departments of economy, international affairs, climate and environment)
2.1 (REGIONAL) POLICY INCENTIVES	2.1.1 Public procurements for BBPs	Assesses the degree to which public procurement is used to boost uptake of BBPs in the region.
	2.1.2 Taxes or subsidies supporting demand for BBPs	Refers to taxes or subsidies at regional (or national) level incentivizing the production or consumption of BBPs over conventional products.
2.2 (REGIONAL) POLICY REGULATION	2.2.1 International laws and regulations (in support/obstacles)	Refers to any national/international legislation, legislation or policy that supports/hinders to roll out of the regional bioeconomy, such as e.g., waste regulation,
	2.2.2 Trade policies (in support/obstacles)	Refers specifically to trade policies and their impact onto the regional bioeconomy.
2.3 (REGIONAL) STRATEGY AND HORIZONTAL LINKAGES	2.2.3 Other policies (in support/obstacles)	Denotes any other kind of legislation, policies or strategies impacting the regional bioeconomy.
	2.3.1 Strategies with bioeconomy focus	Assesses the existence and quality of the strategic set-up in the regional in terms of bioeconomy, e.g., through a dedicated regional bioeconomy strategy.
	2.3.2 Degree of complementary with	Assesses the degree of complementarity of the bioeconomy strategy or related strategies with other



	other sustainability topics	sustainability areas that are regionally mandated, such as climate change mitigation and adaptation.
	2.3.3 Policy commitment	Denotes the commitment to the bioeconomy agenda in the regional government and its agencies, through vast horizontal involvement.
3.1 FINANCE & INVESTMENT	3.1.1 Access to funding for bio-based companies	Assesses the access of funding (private/public) for BB-companies in the region.
3.2 INNOVATION, EMPLOYMENT & VALUE ADDED	3.2.1 SME landscape and birth rate	Refers to the size and volume of BB-start-up and SMEs as indication for the innovation potential of the region in relation to bioeconomy.
	3.2.2 <i>Employment structure (covered by profile indicators)</i>	Assesses the employment in BB-sectors as key indication of their size, relative importance and potential.
	3.2.3 <i>Value Added (covered by profile indicators)</i>	Assesses the employment in BB-sectors as key indication of their size, relative importance and potential.
	3.2.4 Sustainable management practices	Refers to sustainable management practices of BB-companies through e.g., sustainability credentials or certifications.
	3.2.5 Innovation potential	Assesses the bioeconomy innovation potential in the region, in terms of R&D landscape, pilot bioeconomy demonstration activities and through intellectual property rights.
	3.2.6 Market accessibility	Denotes a level playing field as key pre-requisite for a functioning regional bioeconomy market.
3.3 BIOMASS & LAND USE AVAILABILITY	3.2.7 Future workforce	Denotes the degree of pre-school, primary/secondary/tertiary education programmes as key a pre-requisite for building a future workforce locally that is able to deliver on the circular bioeconomy transition.
	3.3.1 Local biomass production	Refers to the biomass extraction and production in the region, including blue biomass, water and soil.
	3.3.2 Emissions intensity of bio-based industry	Refers to the greenhouse gas emissions intensity of bio-based economic activities

2.2 KEY PERFORMANCE INDICATORS

A literature review has been conducted to identify possible indicators that fit to the assessment criteria as derived in the 3rd tier of the governance model framework (Figure 1). The literature largely focuses on empirical indicators for measuring economic and environmental drivers of the regional bioeconomy. On the other hand, governance indicators are not explored in any great depth. This is partly due to the data scarcity on specific governance indicators available in public statistics of the pilot regions (countries). Therefore, other data collection techniques (gathering, expert knowledge via survey, interview) are required to get insight in the status quo of the governance structure in a country or region.

Information has been searched from existing studies and reports (national, international; thematic and generic), and dashboards (online) and resulted into a long list of possible indicators. The list was validated by the stakeholders of the BIOMODEL4REGIONS pilots regarding their usefulness for assessing the status quo with regard to bioeconomy governance according to framework described. Collation of the indicators took place according to items presented in Table 2-3.

Table 2-3 Items of interest to identify and select indicators for populating the governance model

Item	Explanation
Indicator	Definition
Metrics	Quantitative measure; qualitative measure
Geographical scope	Country (nut0); region (nuts1, nuts2)
Sectoral scope	NACE A-I
Time path	Time series; state of art
Data source	Statistics (EU, national); interviews; survey
Other source	Dashboard; projects; reports
Useful for governance model	Yes, no
Assessment criteria	Governance criterion the indicator can be linked

Due to their character, indicators have been classified in two groups:

- *Profile indicators*: these are indicators that reflect the basic socio-economic performance in the pilot region. They are quantitative indicators and can mostly be obtained from secondary data collection, like public national statistics.
- *Governance indicators*: these are specific indicators that reflect the evaluation of the governance assessment criteria in the 2nd tier of the governance assessment framework. They are both qualitative and quantitative indicators and to be obtained from primary data collection, like stakeholder/expert knowledge.

Section 2.2.1 outlines the selected profile indicators per assessment criterion, while section 2.2.2 does the same for the governance indicators.

2.2.1 Profile indicators

Pilot regions in BIOMODEL4REGIONS geographically consist of one or more NUTS2 regions and economically cover one or more NACE sectors. Data for the profile indicators of the pilot regions are collected mainly from public sources like Eurostat, JRC and national sources (Table 2-4). More meta information on the profile indicators can be found in Annex 2.

Table 2-4 Profile KPIs selected to characterize the governance model of pilot regions

Governance field	Assessment criteria	Indicator
Demographic	Population	Total population; population growth; population 15-65 years
Finance & investment	Finance	Total turnover of total industry; total turnover of total biobased industry; GDP in region
	Innovation	total number of research institutions
	Biobased share	Biobased shares in emerging industries (textile, wearing, leather, wood & wood products, paper & pulp, chemical, pharmaceutical, plastics, furniture, energy, waste collection, construction)
Innovation, employment & value added	Employment	Total regional employment; total employment of total regional industry; total bio-based industry employment Total regional companies; total companies in total regional industry; total biobased companies;
	Value added	Total value added in total regional industry; total value added in total biobased industry
	Enterprises	Total regional enterprises; total enterprises of total regional industry; total bio-based industry enterprises

Biomass & land use availability	Biomass availability	Total biomass production
	Land use	Total land area; total forestry land; total agricultural and horticultural land; total organic agricultural farming; total build areas

2.2.2 Governance indicators

Governance indicators are each described in depth below, using the following structure:

1.1.1.1 Indicator: [name]

Unique identifier: [#]

Assessment criteria: [name and reference #]

Impact pathway: [tier-1 name and reference #; tier-2 name and reference #]

Description: [description and rationale]

Metrics: [relevant metrics/units]

Geographical scope (system boundary): [e.g., nuts,1/2/3]

Data source: [indicative data source used by BioModels4Regions pilot experience]

Further comments/notice: [relevant comments according to BioModels4Regions pilot experience]

INFORMATION SHARING

Indicator: Presence of cluster organization

Unique identifier: 1.1.1.1

Assessment criteria: degree of collaboration and consultation, 1.1.1

Impact pathway: Consultation/ collaboration/ information flow across actors, 1.1; information-sharing, 1

Description: the indicator refers to whether a cluster organization exists in the system boundary and the specified year or not. A cluster organization is defined as a bioeconomy cluster, representing different kinds of regional stakeholders in the bioeconomy, including industries, academia or civil society/consumers.

A cluster organization can help synthesize knowledge on- and identify gaps -within the bioeconomy in the region as well as to facilitate addressing them, thus contributing collaboration and consultation as governance practice.

Metrics: yes/no

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: -

Indicator: Collaboration in H2020, CBI-JU, HORIZON projects



Unique identifier: 1.1.1.4

Assessment criteria: degree of collaboration and consultation, 1.1.1

Impact pathway: consultation/ collaboration/ information flow across actors, 1.1; information-sharing, 1

Description: The indicator refers to the number of on-going European projects related to the bioeconomy in the specified year and system boundary.

The collaboration in European projects and initiatives can be viewed as key measure to stimulate pilot project implementation in the region and strengthen collaboration and consultation in the region and beyond.

Metrics: number

Geographical scope (system boundary): nuts2

Data source: Partner knowledge and web-research, such as e.g., https://research-and-innovation.ec.europa.eu/knowledge-publications-tools-and-data/knowledge-centres-and-data-portals_en

Further comments/notice: documentation of the project including project name, web-link, duration and grant number required.

Indicator: Collaboration in macro-regional projects

Unique identifier: 1.1.1.5

Assessment criteria: degree of collaboration and consultation, 1.1.1

Impact pathway: consultation/ collaboration/ information flow across actors, 1.1; information-sharing, 1

Description: The indicator refers to the number of projects related to bioeconomy with macro/inter regional scope and involvement (i.e., involving more than one nuts2 region in the country).

Inter-regional collaboration can be viewed as key instrument to inspire on the one hand side and to learn on the other, thus contributing to good collaboration and consultation practices in the region/country.

Metrics: number

Geographical scope (system boundary): nuts1/2

Data source: National government statistics; partner knowledge

Further comments/notice: documentation of the project including project name, web-link, duration and, if applying grant number, required e.g., BioEAST, BalticRegions, BE-RURAL, BioeconomyREVIER

Indicator: Bio-cluster integrated in science park**Unique identifier:** 1.1.1.7**Assessment criteria:** degree of collaboration and consultation, 1.1.1**Impact pathway:** consultation/ collaboration/ information flow across actors, 1.1; information-sharing, 1

Description: Identify if the bioeconomy cluster is connected to a science park and the diversity of businesses linked to it, e.g. (mix of) private companies, R&D centres, technical institutes, universities.

The interlinkages of the bioeconomy cluster with the science park and other business or R&D stakeholder can further strengthen the impact of the cluster for the region.

Metrics: very high / high / medium / low / very low / none**Geographical scope (system boundary):** nuts2**Data source:** partner knowledge

Further comments/notice: Please state for the justification of the values selected if one or multiple of the following applies: includes R&D, laboratories, innovative SMEs, University, public research institutions.

Indicator: Campaigns/events to raise awareness on bio-based economy**Unique identifier:** 1.1.2.1**Assessment criteria:** public support and acceptance, 1.1.2**Impact pathway:** consultation/ collaboration/ information flow across actors, 1.1; information-sharing, 1

Description: the indicator measures the communication to foster understanding and support to bio-based products steered by the region as share of the overall awareness raising campaigns undertaken by the region. This might include education programmes, initiatives or campaigns with the aim to raise awareness and public acceptance on BBPs specifically and the bioeconomy at large.

Formula: *number awareness raising activities/total number awareness raising activities in the region on industrial activities*

The lack of awareness on the bioeconomy and BBPs has been identified as one of the key barriers in many EU-projects (e.g. BIOVOICES). Addressing this gap through suitable events and activities is a core governance instrument and strongly contributes to public acceptance and support for the bioeconomy in the region.

Metrics: share (%)**Geographical scope (system boundary):** nuts2

Data source: partner knowledge; regional government (e.g., regional development agency, department of education, economic development)

Further comments/notice: indicator requires the number of schools in the system boundary and the number of schools with a dedicated programme in place.

Indicator: Public support and acceptance

Unique identifier: 1.1.2.2

Assessment criteria: public support and acceptance, 1.1.2

Impact pathway: consultation/ collaboration/ information flow across actors, 1.1; information-sharing, 1

Description: the indicator represents a subjective self-assessment to grade the perceived degree of public acceptance towards BPPs in the region. This might not in all cases be distinguishable from support to bioeconomy in a wider sense.

Metrics: very high / high / medium / low / very low / none

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: Please provide some arguments on the grade given.

Indicator: Monitoring and reporting on the bio-based economy

Unique identifier: 1.2.1.1

Assessment criteria: monitoring and reporting, 1.2.1

Impact pathway: accountability/ transparency, certification and award schemes, 1.2; information-sharing, 1

Description: Monitoring and evaluation of bio-based economy may be integrated into sustainability monitoring or bioeconomy monitoring.

Monitoring practices, e.g., as part of bioeconomy strategy developed by the regional government, may be a key vehicle for promoting transparency and accountability towards citizens and businesses on set targets.

Metrics: absent / considered / planned / in preparation / published / revised

Geographical scope (system boundary): non-specific

Data source: partner knowledge

Further comments/notice: In case the evaluation provided refers to bioeconomy as a whole please indicate this in the comments.

Indicator: Certification and labels for BBPs

Unique identifier: 1.2.2.1

Assessment criteria: Certification and sustainability labels for BBPs, 1.2.2

Impact pathway: accountability/ transparency, certification and award schemes, 1.2; information-sharing,¹

Description: The indicator measures the number of BBPs certified or labels with a recognised BBP focus.

Certificates and labels are recognized as key gap to further boost the update of the bioeconomy (e.g., BIOVOICES). Measuring the number of related labels schemes clearly contributes to promoting accountability and transparency in the bioeconomy.

Metrics: number

Geographical scope (system boundary): nuts1/2

Data source: partner knowledge

Further comments/notice: -

Indicator: Share of companies with sustainability credentials

Unique identifier: 1.2.2.2

Assessment criteria: Certification and sustainability labels for BBPs, 1.2.2

Impact pathway: accountability/ transparency, certification and award schemes, 1.2; information-sharing,¹

Description: the indicator refers to the share of bio-based companies in the system boundary which have sustainability credentials (e.g., EMAS or similar).

Formula: *bio-based companies with credentials/bio-based companies total.*

Assessing sustainability practices in BB-companies, clearly contributes to accountability and transparency as good governance principles. It also helps advance the bioeconomy as a relevant concept in the context of environmental sustainability and as a core strategy to promote it.

Metrics: share (%)

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: indicator requires the total number of bio-based companies in the system boundary (data collected under profile indicators) and the total bio-based companies with credentials (partner knowledge).

Indicator: Existence of Inter-ministerial cooperation to develop regional bioeconomy

Unique identifier: 1.3.1.1

Assessment criteria: multi-level collaboration (vertical), 1.3.1

Impact pathway: coordination, cooperation and multi-level governance, 1.3; information-sharing, 1

Description: identification of the type of established forums / formalized exchange mechanisms between different government levels (local, regional, national, EU), i.e., between their dedicated departments mandated to develop the bioeconomy.

Inter-ministerial/ inter-municipal collaboration across different levels of government is a pre-condition for regional economic development. This type of formalized collaboration contributes to multi-level collaboration and more enhanced coordination on the bioeconomy as whole.

Metrics: in place / absent

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: the closed questions shows if there is any collaboration or not.

Indicator: Intensity of inter-ministerial forums

Unique identifier: 1.3.1.2

Assessment criteria: multi-level collaboration (vertical), 1.3.1

Impact pathway: coordination, cooperation and multi-level governance, 1.3; information-sharing, 1

Description: measures the number of inter-ministerial forums in the region.

Inter-ministerial/ inter-municipal collaboration across different levels of government is a pre-condition for regional economic development. This type of formalized collaboration contributes to multi-level collaboration and more enhanced coordination on the bioeconomy as whole.

Metrics: number

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: forums in this regard have a character of reoccurring events/meetings in a formal setting.

Indicator: Existence of inter-regional cooperation to develop regional bioeconomy

Unique identifier: 1.3.2.1

Assessment criteria: interregional cooperation (horizontal), 1.3.2

Impact pathway: coordination, cooperation and multi-level governance, 1.3; information-sharing, 1

Description: identification of the type of established forums / formalized exchange mechanisms between different regional agencies/ departments, i.e., between their dedicated departments mandated to develop the bioeconomy.

Interregional collaboration across different regions/ municipalities is a pre-condition for regional (bio)economic development. This type of formalized collaboration contributes to a more enhanced coordination on the bioeconomy as whole.

Metrics: in place / absent

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: the closed questions shows if there is any collaboration or not.

Indicator: number of inter-regional forums

Unique identifier: 1.3.2.2

Assessment criteria: interregional cooperation (horizontal), 1.3.2

Impact pathway: coordination, cooperation and multi-level governance, 1.3; information-sharing, 1

Description: measures the number of inter-regional forums in the region / formalized exchange mechanisms between different regional agencies/ departments, i.e., between their dedicated departments mandated to develop the bioeconomy.

Interregional collaboration across different regions/ municipalities is a pre-condition for regional (bio)economic development. This type of formalized collaboration contributes to a more enhanced coordination on the bioeconomy as whole.

Metrics: number

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: forums in this regard have a character of recurring events/ meetings in a formal setting.

RULE SETTING



Indicator: Bio-based public procurement policy**Unique identifier:** 2.1.1.1**Assessment criteria:** public procurement for BBP, 2.1.1**Impact pathway:** (regional) policy incentives, 2.1, rule-setting, 2

Description: public procurement can support the market take-up as well as upscaling of BBPs. The indicator measures if bio-based public procurement policies are used by the regional administration.

Metrics: absent / considered / planned / in preparation / published / revised

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: documentation for justification of value required. Please indicate the policy you are referring to giving the name of the policy, the status and link to the document or process.

Indicator: Policy incentives (tax, subsidies) supporting demand of bio-based products**Unique identifier:** 2.1.2.1**Assessment criteria:** taxes or subsidies supporting demand for BBPs, 2.1.2**Impact pathway:** (regional) policy incentives, 2.1, rule-setting, 2

Description: the indicator measures if demand for bio-based products is promoted through financial instruments on national/regional level.

The use of tax or subsidies is a key national or to a lesser degree, regional governance instrument to incentivize producers and consumers of BBPs to prioritize such products over conventional solutions. The successful use of such policy instruments contributes to regional policy setting for the bioeconomy.

Metrics: absent / considered / planned / in preparation / published / revised

Geographical scope (system boundary): nuts0/1/2

Data source: partner knowledge

Further comments/notice: documentation for justification of value required. Please indicate the policy you are referring to giving the name of the policy, the status and link to the document or process.

Indicator: Binding international laws & regulations (supporting bio-based economy)**Unique identifier:** 2.2.1.1

Assessment criteria: international laws and regulations, 2.2.1

Impact pathway: (regional) policy regulation, 2.2; rule-setting, 2

Description: binding international laws and regulations give a back-drop against which some of the activities in the bio-based economy will be shaped. The indicator captures to which degree these international laws (e.g., related EU Directives) and regulations positively influence the development of the regional bio-based economy.

Metrics: very high / high / medium /low / very low / none

Geographical scope (system boundary): nuts0

Data source: partner knowledge

Further comments/notice: documentation for justification of self-assessment required. Please indicate the policy you are referring to giving the name of the policy, the status and link to the document or process.

Indicator: Binding international laws & regulations (obstacle for bio-based economy)

Unique identifier: 2.2.1.1

Assessment criteria: international laws and regulations, 2.2.1

Impact pathway: (regional) policy regulation, 2.2; rule-setting, 2

Description: Binding international laws and regulations give a back-drop against which some of the activities in the bio-based economy will be shaped. The indicator captures to which degree these international laws and regulations negatively influence the development of the regional bio-based economy.

Metrics: very high / high / medium /low / very low / none

Geographical scope (system boundary): nuts0

Data source: partner knowledge

Further comments/notice: documentation for justification of self-assessment required. Please indicate the policy you are referring to giving the name of the policy, the status and link to the document or process.

Indicator: Successful transposition of European laws and regulations that link to bio-based economy

Unique identifier: 2.2.3.1

Assessment criteria: transposition, 2.2.3

Impact pathway: (regional) policy regulation, 2.2; rule-setting, 2

Description: The successful transposition of European laws and regulations related to the bio-based economy ensures that EU directives and legal frameworks are effectively integrated into national or regional legislation. This process is critical for creating a consistent regulatory environment that supports the development and growth of the bio-based economy. The indicator measures the extent to which these laws and regulations have been transposed, reflecting both legal compliance and the potential for fostering bio-based economic activities within the region.

Metrics: very high / high / medium / low / very low / none

Geographical scope (system boundary): nuts1

Data source: partner knowledge

Further comments/notice: documentation for justification of value is required. Please indicate the policy you are referring to giving the name of the policy, the status and link to the document or process. The region might, depending on the political system, have more or less influence on the process of transposition.

Indicator: Trade policies (supporting bio-based economy)

Unique identifier: 2.2.4.1

Assessment criteria: trade policies (in support/obstacle), 2.2.4

Impact pathway: (regional) policy regulation, 2.2; rule-setting, 2

Description: as a specific type of international law might support or hinder the development of the bio-based economy. Notably, if primary or secondary biomass needs to be important or the BBP is primarily of interest in the international market.

This indicator captures the degree to which such trade policies impact (positively) the regional bio-based economy development.

Metrics: very high / high / medium / low / very low / none

Geographical scope (system boundary): nuts1

Data source: partner knowledge

Further comments/notice: documentation for justification of value is required. Please indicate the policy you are referring to giving the name of the policy, the status and link to the document or process. The region might, depending on the political system, have more or less influence on the process of transposition.

Indicator: Trade policies (obstacles for bio-based economy)

Unique identifier: 2.2.5.1

Assessment criteria: trade policies (in support/obstacle), 2.2.5

Impact pathway: (regional) policy regulation, 2.2; rule-setting, 2

Description: as a specific type of international law might support or hinder the development of the bio-based economy. Notably, if primary or secondary biomass needs to be important or the BBP is primarily of interest in the international market.

This indicator captures the degree to which such trade policies impact (negatively) the regional bio-based economy development.

Metrics: very high / high / medium / low / very low / none

Geographical scope (system boundary): nuts1

Data source: partner knowledge

Further comments/notice: documentation for justification of assessment is required. Please indicate the policy you are referring to giving the name of the policy, the status and link to the document or process. The region might, depending on the political system, have more or less influence on the process of transposition of relevant trade policies.

Indicator: Policy regulations in place (supporting for bio-based economy)

Unique identifier: 2.2.6.1

Assessment criteria: Other policies (in support/obstacles), 2.2.6

Impact pathway: (regional) policy regulation, 2.2; rule-setting, 2

Description: the indicator captures to which degree national, regional, or European policies or regulations that are promoting/supporting the development of the regional bio-based economy (e.g., supply or processing).

A qualitative description of the rated policies is required for indicator 2.2.6.1

Metrics: very high / high / medium / low / very low / none

Geographical scope (system boundary): nuts0/1/2/3

Data source: partner knowledge

Further comments/notice: documentation for justification of the assessment required. Please indicate the policy you are referring to giving the name of the policy, the status and link to the document or process.

Indicator: Policy regulations in place (obstacles for bio-based economy)

Unique identifier: 2.2.6.1

Assessment criteria: Other policies (in support/obstacles), 2.2.6

Impact pathway: (regional) policy regulation, 2.2; rule-setting, 2

Description: the indicator captures to which degree national, regional, or European policies or regulations that are limiting the development of the regional bio-based economy (e.g., supply or processing).

Metrics: very high / high / medium / low / very low / none

Geographical scope (system boundary): nuts0/1/2/3

Data source: partner knowledge

Further comments/notice: documentation for justification of the assessment required. Please indicate the policy you are referring to giving the name of the policy, the status and link to the document or process.

Indicator: Dedicated regional bioeconomy strategies

Unique identifier: 2.3.1.1

Assessment criteria: strategies with bioeconomy focus, 2.3.1

Impact pathway: (regional) strategy and horizontal linkages, 2.3; rule-setting, 2

Description: Regional bioeconomy strategies are in many cases strongly interlinked with the bio-based economy. The indicator captures if such dedicated bioeconomy strategies are in place in the target region at regional or national level.

Metrics: absent / considered / planned / in preparation / published / revised

Geographical scope (system boundary): nuts1/2

Data source: partner knowledge

Further comments/notice: the reference to 'bioeconomy' and not to 'bio-based economy' is specifically chosen here to denote the wider scope these strategies could have, i.e., beyond the bio-based economy.

Indicator: Regional strategies with links to bioeconomy and bio-based economy

Unique identifier: 2.3.2.1

Assessment criteria: degree of complementarity with other sustainability topics, 2.3.2

Impact pathway: (regional) strategy and horizontal linkages, 2.3; rule-setting, 2

Description: the indicator quantifies those regional policies, strategies and instruments that link to goals of the bioeconomy.

A bioeconomy strategy, which is broadly linked to other policy areas of the region, is viewed positively and can be part of integrated approach to sustainable urban or regional development.

Metrics: number

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: the reference to 'bioeconomy' and not to 'bio-based economy' is specifically chosen here to denote the wider scope these strategies could have, i.e., beyond the bio-based economy.

Indicator: Number of government departments and agencies involved in bioeconomy strategy roll-out/implementation

Unique identifier: 2.3.3.1

Assessment criteria: policy commitment, 2.3.3

Impact pathway: (regional) strategy and horizontal linkages, 2.3; rule-setting, 2

Description: the indicator captures all regional government departments, or related agencies that are involved in the development and/or roll-out/implementation of the bioeconomy.

Broad participation of different departments within the regional administration, indicates a strong commitment to the policy objectives of the bioeconomy.

Metrics: number

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: the reference to 'bioeconomy' and not to 'bio-based economy' is specifically chosen here to denote the wider scope these strategies could have, i.e., beyond the bio-based economy.

Indicator: Policy commitment to bioeconomy and bio-based economy strategy implementation through in media

Unique identifier: 2.3.3.2

Assessment criteria: policy commitment, 2.3.3

Impact pathway: (regional) strategy and horizontal linkages, 2.3; rule-setting, 2

Description: the indicator captures the degree to which different communication channels have been used to inform about the bio-based economy. This may include a variety of channels (social

media, newspaper etc.) and stakeholders by policy makers and institutions (governmental agencies, ministers etc.)

A very diverse number of channels would constitute a 'very high' rating and thus indicate a strong policy commitment by the involved department, agencies and ministries at regional level.

Metrics: very high / high / medium / low / very low / none

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: n.a.

IMPLEMENTATION & FINANCE

Indicator: Access to private funds used by the biobased companies

Unique identifier: 3.1.1.1

Assessment criteria: funding for bio-based companies, 3.1.1

Impact pathway: finance and investment, 3.1; implementation and finance, 3

Description: funding opportunities will support the establishment of bio-based companies. This indicator measures qualitatively the access to private funding in general, or for a specific bio-based sector, depending on the scope of the assessment.

Metrics: very high / high / medium / low / very low / none

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: documentation for justification of value required. Please provide link to the sources. For BERST CS regions, data is available: biobased delta (NL), Westland (NL), Straubing (DE), Western Macedonia (GR), FPCM (ES), Central Finland (FI).

Indicator: Access to public funds used by biobased companies

Unique identifier: 3.1.1.2

Assessment criteria: funding for bio-based companies, 3.1.1

Impact pathway: finance and investment, 3.1; implementation and finance, 3

Description: funding opportunities will support the establishment of bio-based companies. This indicator measures qualitatively the access to public funding in general, or for a specific bio-based sector, depending on the scope of the assessment.

Metrics: very high / high / medium / low / very low / none

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: documentation for justification of value required. Please provide link to the sources. For BERST CS regions, data is available: biobased delta (NL), Westland (NL), Straubing (DE), Western Macedonia (GR), FPCM (ES), Central Finland (FI).

Indicator: Presence of incubator

Unique identifier: 3.2.1.1

Assessment criteria: SME landscape and birth rate, 3.2.1

Impact pathway: innovation, employment and value added, 3.2; implementation and finance, 3

Description: the indicator measures if an incubator exists and whether it is actively promoting bio-based economy. Incubators may support the link between innovation and markets and therefore constitute a good indication for the innovation dynamic in the region.

Metrics: activity level (yes/no)

Geographical scope (system boundary): nuts2/3

Data source: partner knowledge

Further comments/notice: For BERST CS regions: biobased delta (NL), Westland (NL), Straubing (DE), Western Macedonia (GR), FPCM (ES), Central Finland (FI).

Indicator: Regional guidance on sustainability practices for bio-based economy sector

Unique identifier: 3.2.4.1

Assessment criteria: sustainable management practices, 3.2.4

Impact pathway: innovation, employment and value added, 3.2; implementation and finance, 3

Description: the implementation of governance along ecological, economic and social criteria can be measured the existence of regional guidance, support schemes, which are being issued and adopted by bio-based companies.

The indicator captures the status of such guidance in the region.

Metrics: absent / considered / planned / in preparation / published / revised

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: documentation for justification of assessment is required. Please provide link to the sources where possible.

Indicator: R&D expenditure per capita

Unique identifier: 3.2.5.1

Assessment criteria: innovation potential, 3.2.5

Impact pathway: innovation, employment and value added, 3.2; implementation and finance, 3

Description: the indicator captures the per capita public/private expenditure for R&D in the region (not differentiating between bio-based on non-bio-based).

The overall regional R&D expenditure on the regional level may indicate the general innovation landscape and hint at favouring or limiting conditions.

Metrics: Million euros per capita

Geographical scope (system boundary): nuts2

Data source: regional Innovation Scoreboard & Innovation Union Scoreboard; chamber of commerce

Further comments/notice: documentation for justification of assessment is required. Please provide link to the sources where possible. Available on BERST for: BE, DE, EE, ES, FI, GR, LV, NL, NO, PL, SI and UK ; for 2016.

Indicator: Pilot and Demonstration facilities

Unique identifier: 3.2.5.2

Assessment criteria: innovation potential, 3.2.5

Impact pathway: innovation, employment and value added, 3.2; implementation and finance, 3

Description: pilot and demonstration facilities represent bridges between generating basic knowledge and technological breakthroughs, and industrial applications and commercial adoption. The indicator measures the number of pilots and demonstration facilities in the regional bioeconomy.

Metrics: absent / considered / planned / in preparation / published / revised

Geographical scope (system boundary): nuts2

Data source: regional Innovation Scoreboard & Innovation Union Scoreboard; chamber of commerce

Further comments/notice: since the regions are rather different in size, we propose a qualitative measurement. However, documentation for justification of value is required. Please provide link to the sources and the number of facilities.

Indicator: Intellectual property rights**Unique identifier:** 3.2.5.3**Assessment criteria:** innovation potential, 3.2.5**Impact pathway:** innovation, employment and value added, 3.2; implementation and finance, 3

Description: the indicator captures the number of regionally patented bio-based products per capita, which provides a good general indication on the bio-based innovation potential in the region.

Metrics: number**Geographical scope (system boundary):** nuts2

Data source: regional Innovation Scoreboard & Innovation Union Scoreboard; chamber of commerce

Further comments/notice: documentation for justification of assessment is required. Please provide link to the sources where possible.

Indicator: Level playing field**Unique identifier:** 3.2.6.1**Assessment criteria:** market accessibility, 3.2.6**Impact pathway:** innovation, employment and value added, 3.2; implementation and finance, 3

Description: equal opportunities in the open market are measured through the indicator level playing field. It measures if bioeconomy and bio-based economy are equally supported as the fossil-based economy by the institutions setting the relevant framework conditions.

The indicator constitutes a qualitative self-assessment, to capture the degree to which such level playing field is perceived as such for the regional bio-based economy, or not.

Metrics: very high/ high / medium / low / very low / none**Geographical scope (system boundary):** nuts1/2

Data source: regional Innovation Scoreboard & Innovation Union Scoreboard; chamber of commerce

Further comments/notice: documentation for justification of assessment is required. Please provide link to the sources where possible.

Indicator: Licensing new permits indirectly linked to BBPs (e.g. building permits)**Unique identifier:** 3.2.6.2**Assessment criteria:** market accessibility, 3.2.6

Impact pathway: innovation, employment and value added, 3.2; implementation and finance, 3

Description: The indicator measures (qualitative self-assessment) the rate of licenses given which are linked indirectly to BBPs.

The indicator results imply indication on the bureaucratic burden, given by a qualitative description on the process of permits indirectly linked to BBP (e.g., building permits etc.) as a proxy for the framework conditions prevalent in the regions to support the BB-economy through a quick and dynamic licensing process.

Metrics: very high/ high / medium / low / very low / none

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: documentation for justification of assessment is required. Please provide link to the sources where possible.

Indicator: Licensing new permits directly linked to BBPs

Unique identifier: 3.2.6.3

Assessment criteria: market accessibility, 3.2.6

Impact pathway: innovation, employment and value added, 3.2; implementation and finance, 3

Description: The indicator measures (qualitative self-assessment) the rate of licenses given which are linked directly to BBPs.

The indicator results imply indication on the bureaucratic burden, given by a qualitative description on the process of permits indirectly linked to BBP as a proxy for the framework conditions prevalent in the regions to support the BB-economy through a quick and dynamic licensing process.

Metrics: very high/ high / medium / low / very low / none

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: documentation for justification of assessment is required. Please provide link to the sources where possible.

Indicator: Existence of good practices for developing regional bioeconomy

Unique identifier: 3.2.6.4

Assessment criteria: market accessibility, 3.2.6

Impact pathway: innovation, employment and value added, 3.2; implementation and finance, 3

Description: indicator qualitatively assesses whether good practices on market accessibility are exist for the region, implying that good practices are helpful to develop the bioeconomy in region.

Metrics: yes / not available

Geographical scope (system boundary): nuts2

Data source: partner knowledge

Further comments/notice: documentation for justification of assessment is required. Please provide link to the sources where possible.

Indicator: Pre-school education programs

Unique identifier: 3.2.7.1

Assessment criteria: future workforce, 3.2.7

Impact pathway: innovation, employment and value added, 3.2; implementation and finance, 3

Description: number of existing programmes in pre-school education included in the curriculum that inform and teach on bioeconomy and bio-based economy.

The existence of such programs is a good proxy for the development of a skilled workforce, able to deliver on the objectives of the bioeconomy.

Metrics: number

Geographical scope (system boundary): nuts2

Data source: national statistics

Further comments/notice: documentation for justification of assessment is required.

Indicator: Primary education programs

Unique identifier: 3.2.8.2

Assessment criteria: future workforce, 3.2.8

Impact pathway: innovation, employment and value added, 3.2; implementation and finance, 3

Description: number of existing programmes in primary education included in the curriculum that inform and teach on bioeconomy and bio-based economy.

The existence of such programs is a good proxy for the development of a skilled workforce, able to deliver on the objectives of the bioeconomy.

Metrics: number

Geographical scope (system boundary): nuts2



Data source: national statistics

Further comments/notice: documentation for justification of assessment is required.

Indicator: Secondary education programs

Unique identifier: 3.2.8.3

Assessment criteria: future workforce, 3.2.8

Impact pathway: innovation, employment and value added, 3.2; implementation and finance, 3

Description: number of existing programmes in secondary education included in the curriculum that inform and teach on bioeconomy and bio-based economy.

The existence of such programs is a good proxy for the development of a skilled workforce, able to deliver on the objectives of the bioeconomy.

Metrics: number

Geographical scope (system boundary): nuts2

Data source: national statistics

Further comments/notice: documentation for justification of assessment is required.

Indicator: Tertiary and vocational education programs

Unique identifier: 3.2.8.4

Assessment criteria: future workforce, 3.2.8

Impact pathway: innovation, employment and value added, 3.2; implementation and finance, 3

Description: number of existing programmes in tertiary and vocational education where the curriculum includes bioeconomy and bio-based economy.

The existence of such programs is a good proxy for the development of a skilled workforce, able to deliver on the objectives of the bioeconomy.

Metrics: number

Geographical scope (system boundary): nuts2

Data source: national statistics

Further comments/notice: documentation for justification of assessment is required.

Indicator: Presence of human capital agenda



Unique identifier: 3.2.8.6

Assessment criteria: future workforce, 3.2.8

Impact pathway: innovation, employment and value added, 3.2; implementation and finance, 3

Description: human capital agenda is an agenda which identifies and tackles the discrepancies in the labour market on demand and supply of personnel.

The existence of such systemic approach is a good proxy for how the region is addressing the issue strategically.

Metrics: absent / considered / planned / in preparation / published / revised

Geographical scope (system boundary): nuts2

Data source: national statistics

Further comments/notice: documentation for justification of assessment is required.

Indicator: Agricultural biomass production per capita

Unique identifier: 3.3.1.1

Assessment criteria: local biomass production, 3.3.1

Impact pathway: biomass and land use availability, 3.3; implementation and finance, 3

Description: the indicator captures the production of agricultural biomass per capita in the region (using the MFA Eurostat methodology and data).

Metrics: kilograms per capita

Geographical scope (system boundary): nuts1/2

Data source: Eurostat

Further comments/notice: For general information on Material Flow Accounting – MFA, including the DMC indicator, see [Eurostat](#).

Indicators were not used as such by the BIOMODEL4REGIONS pilot regions for now. Local biomass types were estimated for nuts2 level from EC-JRC data at nuts0 level in previous section on profile indicators. These have been assigned to regions/nuts2 based on agr/forestry/waste land use types.

Indicator: Blue biomass production per capita

Unique identifier: 3.3.1.2

Assessment criteria: local biomass production, 3.3.1

Impact pathway: biomass and land use availability, 3.3; implementation and finance, 3

Description: the indicator captures the production of blue biomass per capita in the region (using the MFA Eurostat methodology and data).

Metrics: tons per capita

Geographical scope (system boundary): nuts1/2

Data source: Eurostat

Further comments/notice: For general information on Material Flow Accounting – MFA, including the DMC indicator, see [Eurostat](#).

Indicators were not used as such by the BIOMODEL4REGIONS pilot regions for now. Local biomass types were estimated for nuts2 level from EC-JRC data at nuts0 level in previous section on profile indicators. These have been assigned to regions/nuts2 based on agr/forestry/waste land use types.

Indicator: Forestry biomass production per capita

Unique identifier: 3.3.1.3

Assessment criteria: local biomass production/consumption, 3.3.1

Impact pathway: biomass and land use availability, 3.3; implementation and finance, 3

Description: the indicator captures the production of forestry biomass per capita in the region (using the MFA Eurostat methodology and data).

Metrics: kilograms per capita

Geographical scope (system boundary): nuts1/2

Data source:

Further comments/notice: For general information on Material Flow Accounting – MFA, including the DMC indicator, see [Eurostat](#).

Indicators were not used as such by the BIOMODEL4REGIONS pilot regions for now. Local biomass types were estimated for nuts2 level from EC-JRC data at nuts0 level in previous section on profile indicators. These have been assigned to regions/nuts2 based on agr/forestry/waste land use types.

Indicator: Waste biomass production per capita

Unique identifier: 3.3.1.4

Assessment criteria: local biomass production/consumption, 3.3.1

Impact pathway: biomass and land use availability, 3.3; implementation and finance, 3

Description: the indicator captures the amount of waste generated in the region, including biomass derived waste from agriculture, forestry and marine ecosystems.

Metrics: kilograms per capita

Geographical scope (system boundary): nuts1/2

Data source: national/regional/municipal statistics; Eurostat

Indicator: Emissions intensity of bio-based industry

Unique identifier: 3.3.2.1

Assessment criteria: GHG emissions, 3.3.2

Impact pathway: biomass and land use availability, 3.3; implementation and finance, 3

Description: Indicating the tons of CO₂ equivalent emissions per euro of economic activity in the region's sector represented in the project. CO₂ equivalents are calculated as an aggregate of N₂O, CH₄ and CO₂ emissions.

Metrics: tCO₂e/€

Geographical scope (system boundary): nuts 2

Data source: Eurostat; regional statistics

Further comments/notice: documentation for justification required.

Finally, Annex 2 gives a complete overview of all KPIs in terms of definition, metrics, data source, geographic and temporal scope, and position in the governance model framework.

2.2.3 Benchmarking

As indicated above, the indicators can be used to assess (or self-assess) the status quo with regard to the assessment criteria. However, in order to understand whether the obtained values indicate a 'good', 'poor' or 'medium' performance, this Handbook includes benchmarks that allow the scoring of specific assessment criteria (3rd tier of governance model) and bioeconomy governance functions (2nd tier of the governance model). The benchmarks were created using literature reviews, project reports and studies as well as expert judgement.

3 SELF-ASSESSMENT TOOL FOR REGIONAL BIOECONOMY GOVERNANCE

The framework assessing the governance of the bioeconomy (Chapter 2) is a helpful tool to explore the current governance performance of EU regions and to investigate possible hot spots for future improvements. These insights serve as starting point for developing smart strategies that aim to identify and implement "good governance" on the regional bioeconomy.

The governance functions, assessment criteria and the set of key profile and governance indicators (Chapter 2; Figure 1) form the basis of the Excel-based **Governance Self-Assessment Tool** (G-SAT) that accompanies this Handbook. Any region can apply the G-SAT and populate it with its regional specific governance data. In principle, a "region" can have any size though for statistical

consistency it makes sense if boundaries comply to standardized territorial NUTS classifications (<https://ec.europa.eu/eurostat/web/nuts>).

When values or the indicators have been entered in the Excel based G-SAT they are automatically scored and benchmarked to reference scores (see section 2.2.3). In a last step, the G-SAT produces some standardized graphs that visualise the governance status quo of the region at stake. Based on this performance, regional public and private stakeholders could discuss and decide if there is urgency to improve specific governance functions through e.g. interventions.

The G-SAT excel file has three tabs, i.e. the 'Instruction' tab (section 3.1), the 'Fill indicators' tab (section 3.2), and the 'Dashboard' tab (section 3.3).

3.1 'INSTRUCTION' TAB

► Introduction

The BIOMODEL4REGIONS project developed a governance model, which contains key performance (KPIs) that describe the current governance performance of a region. The governance model was validated and populated with regional specific data for pilots that participated in the project: North Swedish region (SE), Spring (IT), West-Macedonia (GR), Biobased Delta (NL), Nitra region (SK) and Normandy (FR). The quantified governance models for these pilot regions are presented in the online BERST dashboard and accessible by the link: [Online BERST dashboard on Governance](#).

A region-specific governance model gives insight into the status and quality of bioeconomy governance in the region. Regional stakeholders can decide themselves whether and how to take action based on those insights.

► Governance Self-Assessment Tool (G-SAT)

The BIOMODEL4REGIONS project has developed a Self-Assessment Tool, which is an Excel file available on the online BERST dashboard (Figure 2). It can be downloaded from there.

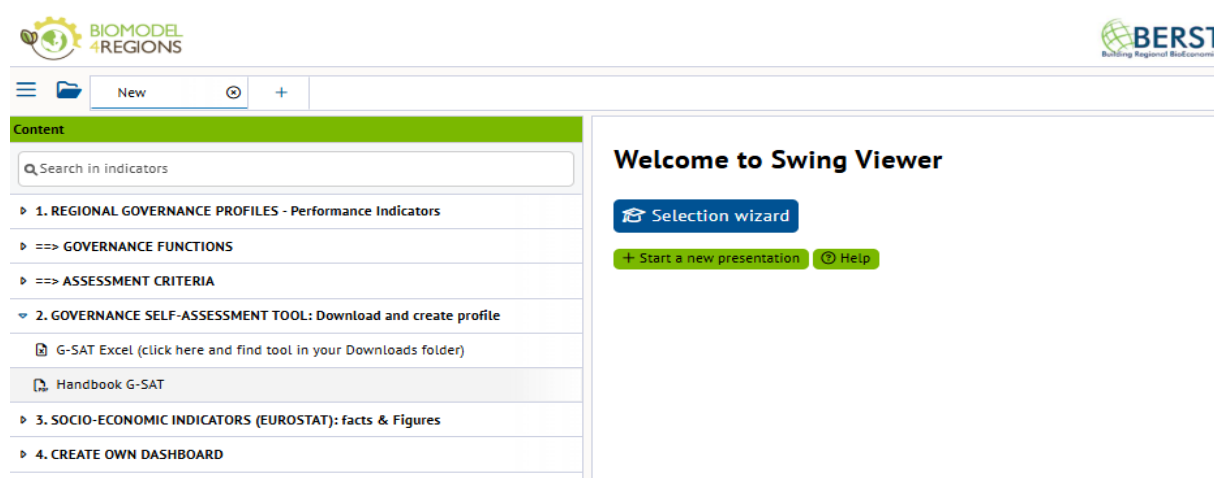


Figure 2 Governance Self-Assessment Tool for download in the online BERST dashboard

The purpose of the G-SAT is to offer *any region* the opportunity to characterise its own governance model and to provide insight into its governance performance status today. The G-SAT contains the KPIs of the governance model that must be populated with regional specific data based on expertise from the region at stake.

Values of the KPIs can – in principle – be entered for any regional identity, but it makes sense if the scope of a region complies to known administrative boundaries (e.g. NUTS2). KPIs should be filled based on knowledge/expertise of regional representatives. In general public sources on governance lack and therefore it is important that regional experts make an estimate for the indicators, e.g. by indicating in which range the indicator value lies (via pulldown menus). The G-SAT contains following steps:

1. Download the Excel file from the online BERST dashboard and read instructions.
2. Go to the '*Fill indicators*' tab and a) select a NUTS2 region (in cell E1), and b) collect and fill region-specific values for the indicators (in column E).
3. Go to the '*Dashboard*' tab and inspect the self-generated graphs showing the governance performance of the selected region, benchmarked against the pilot regions in the BIOMODEL4REGIONS project.
4. Validate and discuss findings with regional experts and – if preferred - develop action and implementation plans to improve region's governance performance.
5. If help is required from the BIOMODEL4REGIONS project:
 - a. Contact ICLEI, that developed the governance model, to discuss findings and how to get support on possible actions.
 - b. Contact Wageningen Research, that developed the BERST dashboard, to address possible actions on the use of BERST.

► *Guidance Handbook*

The G-SAT is accompanied with this Handbook that is also available on the online BERST dashboard and can be downloaded from there (Figure 2). The Handbook contains information and guidance on:

- The governance model and associated list of KPIs (Chapter 2, this Handbook).
- The Governance Self-Assessment Tool (Chapter 3, this Handbook).
- The BERST dashboard (Chapter 4, this Handbook).

3.2 'FILL INDICATOR VALUES' TAB

This is the key sheet. Here a specific (NUTS2) region can be selected for which values for governance performance indicators can be entered.

Step 1: Click on cell E1 and then the drop-down menu with all NUTS2 regions of the EU appears. Then select the region of interest, e.g. **Łódzkie in Poland. (PL71 NUTS2 region)**.

Step 2: Enter values for each indicator (first column) via drop-down menu selections in the second column. E.g. for the 'Presence of cluster organisation' indicator the value 'yes' (if there is/are one or more in the region) or 'no' (if there isn't one in the region) can be entered. Or for the 'Public support and acceptance' indicator the value 'very high', 'high', 'medium', 'low', 'very low' or 'none' can be entered.

It may be challenging to obtain values for some indicators. In that case, you could enter the 'don't know' option, though alternatively you can attempt to estimate the value, e.g. by contacting relevant regional experts or practitioners.

SELECT YOUR REGION (NUTS 2) ==>		Łódzkie (PL71)
GOVERNANCE INDICATORS		Enter values via pull-down
Presence of cluster organisation		yes
Industrial networks/PPP in the region (%)		3%
Collaboration with universities or research institutes (%)		0%
Collaboration in H2020, CBI-JU, HORIZON projects		11%
Collaboration in macro-regional projects		15
Companies in cluster/bio-based companies total (%)		fill in %
Biocluster integrated in science park		high
Campaigns/events to raise awareness on bio-based economy		0
Public support and acceptance		low
Monitoring and reporting on the bio-based economy in place		considered
Certification and labels for BBPs in place		no
Share of companies with sustainability credentials (%)		10%
Existence of Interministerial cooperation to develop bioeconomy in your region		in place
Intensity of interministerial forums		low
Existence of Interregional cooperation to develop bioeconomy in your region		In place.
Interregional forums (number)		4
Bio-based public procurement policy		planned
Policy incentives (tax, subsidies) supporting demand of bio-based products		published
Binding international laws & regulations (supporting bio-based economy)		Low
Binding international laws & regulations (obstacle for bio-based economy)		Low
Successful transposition of European laws and regulations that link to bio-based economy.		very high
Trade policies (supporting bio-based economy)		medium
Trade policies (obstacles for bio-based economy)		very low
Policy regulations in place (supporting bio-based economy)		very low
Policy regulations in place (obstacles for bio-based economy)		very high
Dedicated regional bioeconomy strategies		revised
Regional strategies with links to bioeconomy and bio-based economy		0
Number of government departments and agencies involved in bioeconomy strategy roll-out/implementation		1
Policy commitment to bioeconomy and bio-based economy strategy implementation through in media		medium
Access to private funds used by the biobased companies		very low
Access to public funds used by biobased companies		high
Presence of incubator		yes
Regional guidance on sustainability practices for bio-based economy sector		Published
R&D expenditure (% in regional GDP)		2%.
Pilot and Demonstration facilities		yes

1. Select region

Select 'yes' or 'no'

Select 'very high', 'high', 'medium', 'low', 'very low' or 'none'



Intellectual property rights bb products/capita (number)	20
Level playing field	none
Licensing new permits indirectly linked to biobased products (e.g. building permits etc.)	very low
Licensing new permits directly linked to biobased products	very low
Existence of good practices for developing regional bioeconomy	yes
Pre-school education programs	low
Primary education programs	medium
Secondary education programs	35
Tertiary education programs	27
Number of vocational programmes on bio-based economy	9
Presence of human capital agenda	in preparation

3.3 'DASHBOARD' TAB

As explained in section 2.2.3 the indicators should be used to assess the status quo on the assessment criteria of the governance model (Figure 1 and Table 2.2 of this Handbook). When KPI values for the region, e.g. **Łódzkie in Poland** (PL71)¹ were entered in the 'Fill Indicator' tab, they are automatically scored against a reference. In order to understand whether the obtained values indicate a 'good' (score 3), 'poor' (score 1) or 'medium' (score 2) performance, benchmarks were created using literature reviews, project reports and studies, and expert judgement. The benchmarks allow scoring of specific assessment criteria (Bioeconomy governance functions, see Figure 4) or bioeconomy governance functions (Assessment criteria, see Figure 3 and Figure 4). For more detailed explanation of the benchmarks, see section 2.2.3 (and Deliverable 3.3 of BIOMODEL4REGIONS report by Jacobi et al., 2024).

¹ Fictive values have been entered for Lodzkie, as the region has been randomly chosen as example how to assess the G-SAT.

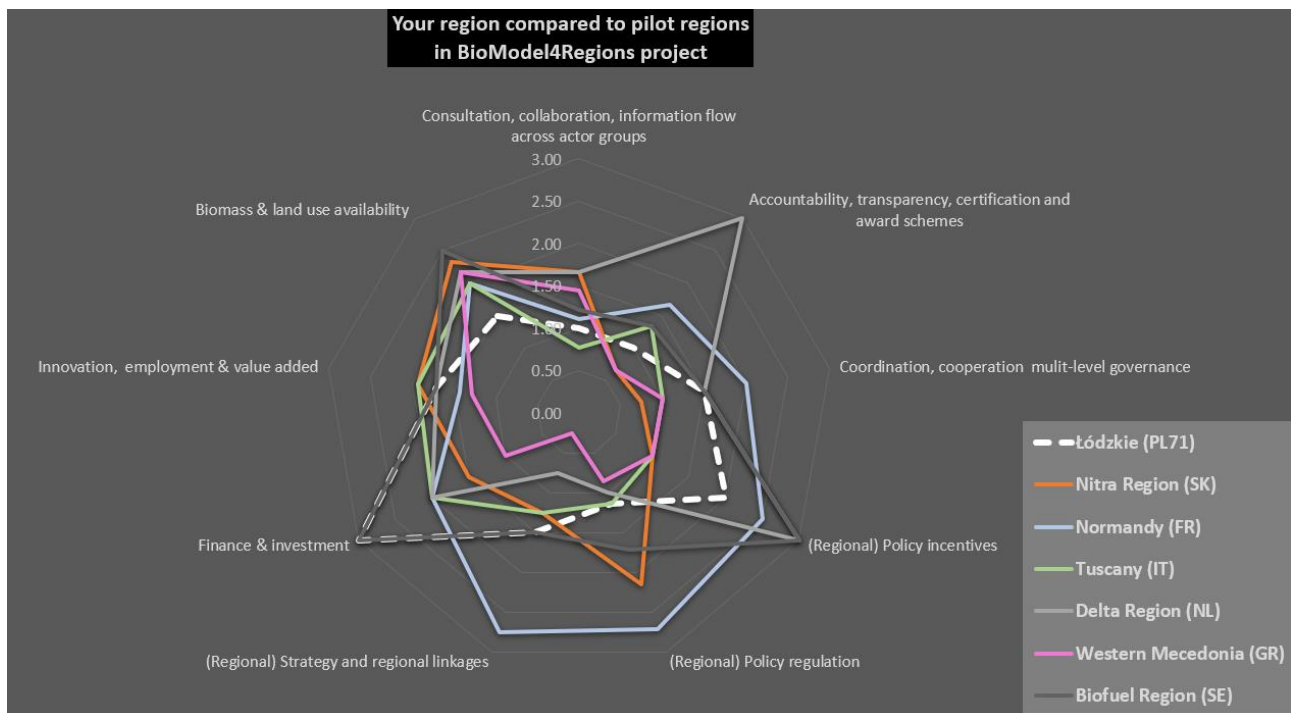


Figure 3 Performance of **Łódzkie** (fictive values) and pilot regions (in BIOMODEL4REGIONS project) bioeconomy governance functions (2nd tier of Governance Model)

First important step is to understand and validate findings for the region at stake, in this example **Łódzkie** (white dotted line).

► Which insights do Figure 2 (**Łódzkie** and pilot regions are shown) and Figure 4 (only **Łódzkie** is shown) provide on the status of the main bioeconomy governance functions (2nd tier of Governance Model), i.e. Information Sharing, Rule Setting and Finance & Implementation?

Information sharing:

- 'Consultation, collaboration, information flow across actor groups' function (score 1) and 'Accountability transparency, certification and awareness' function (score 1) perform 'low';
- 'Coordination, cooperation multi-level governance (score 1,5) performs relatively 'low'.

Rule Setting:

- '(Regional) policy incentives' (score 2) performs 'moderate'.
- '(Regional) policy regulation (score 1,4) and '(Regional) strategy and regional linkages (score 1,5) perform relatively 'low'.

Finance and Implementation

- 'Finance & Investment' (score 3) performs 'good'.
- 'Innovation, employment & value added' (score 1,7) performs almost 'moderate'.
- 'Biomass & land use availability (score 1,5) performs between 'low' and 'moderate'.

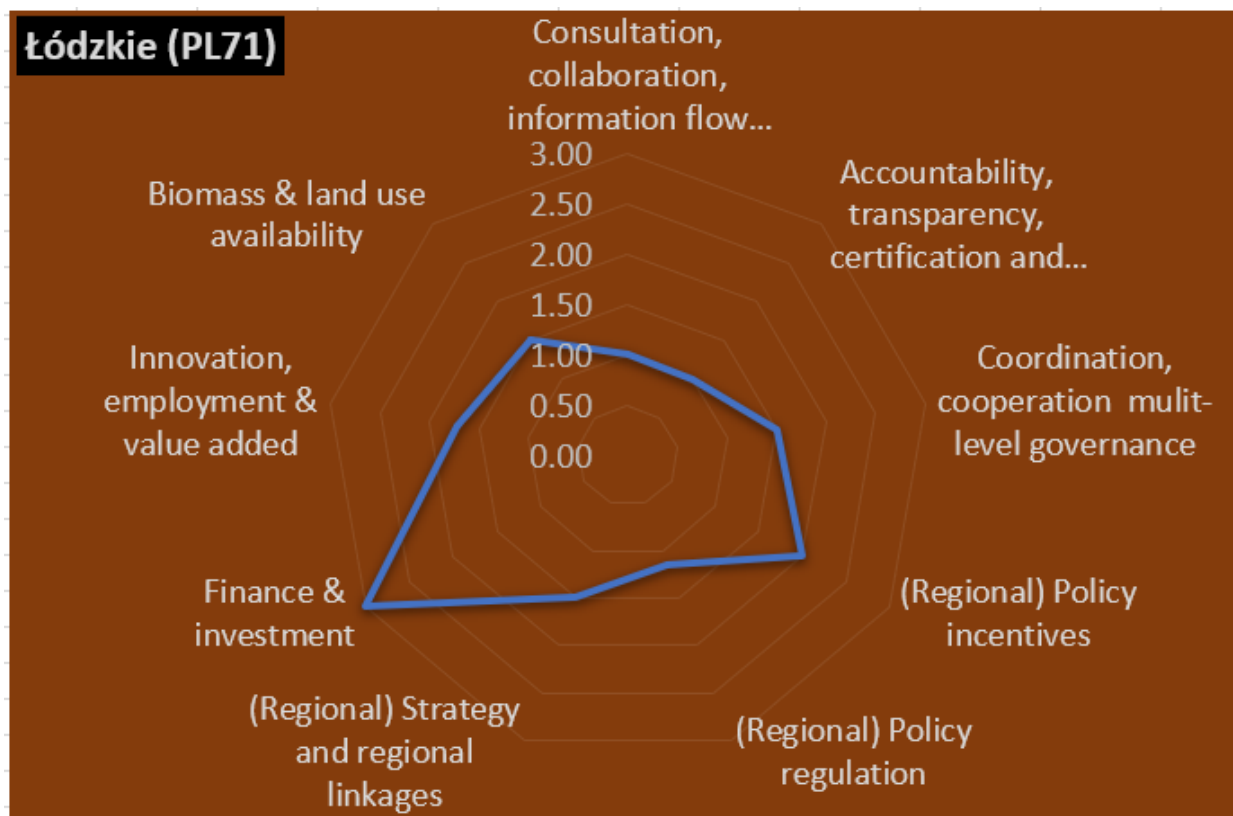


Figure 4 Performance of **Łódzkie** (fictive values) in bioeconomy governance functions (2nd tier of governance model)

The second step is to analyse the assessment criteria (the key performance indicators) of the governance model (3rd tier that lie beyond the bioeconomy governance functions of the governance model (2nd tier) .

► Which insights does Figure 22 (**Łódzkie**) provide on the key performance indicators of the Governance Model (3rd tier)?

Some highlights:

Highest scoring key performance indicators include:

- Monitoring & reporting (information-sharing)
- Tariffs, taxes and subsidies supporting demand (rule-setting)
- Successful transposition of EU law (rule-setting)
- Strategies/policies with bioeconomy focus (rule-setting)
- Funding for bio-based companies (implementation & finance)
- SME landscape & birthrate (implementation & finance)

Lowest scoring key performance indicators include:

- Public support and acceptance (information sharing)
- Public procurement for biobased products (information sharing)
- Trade policies, obstacles (rule setting)
- Regulation, support/obstacle (rule setting)

- Innovation potential (implementation & finance)
- Local biomass availability (implementation & finance)

Visualisations in Figure 3 and Figure 4 and Figure 5 provide insights into the effectiveness of current policies and initiatives, and identifies opportunities for improvement. Last but not least, the third step is to make a smart /tailormade action and implementation plan for the governance functions that require improvements in the view of regional stakeholders (from private and public sectors, i.e. **Łódzkie** in the virtual example.

Guidance on starting this process can be found in the BioModle4Regions report on ‘Governance and policy regime for the bioeconomy and bioeconomy potential in the pilot regions’ (Nikolai et al, 2024), which can be downloaded from the BERST dashboard. It shows how bioeconomy governance in respectively the North Swedish Region, Sweden (purple line, Figure 3); Nitra, Slovakia (orange line, Figure 2); the Delta Region, Netherlands (grey line, Figure 3), Normandy, France (light blue line, Figure 2); Tuscany, Italy (green line, Figure 3); and Western Macedonia, Greece (pink line, Figure 3) has been analysed. For each region the report provides insights into effectiveness of current policies and initiatives, and identifies opportunities for improvement.

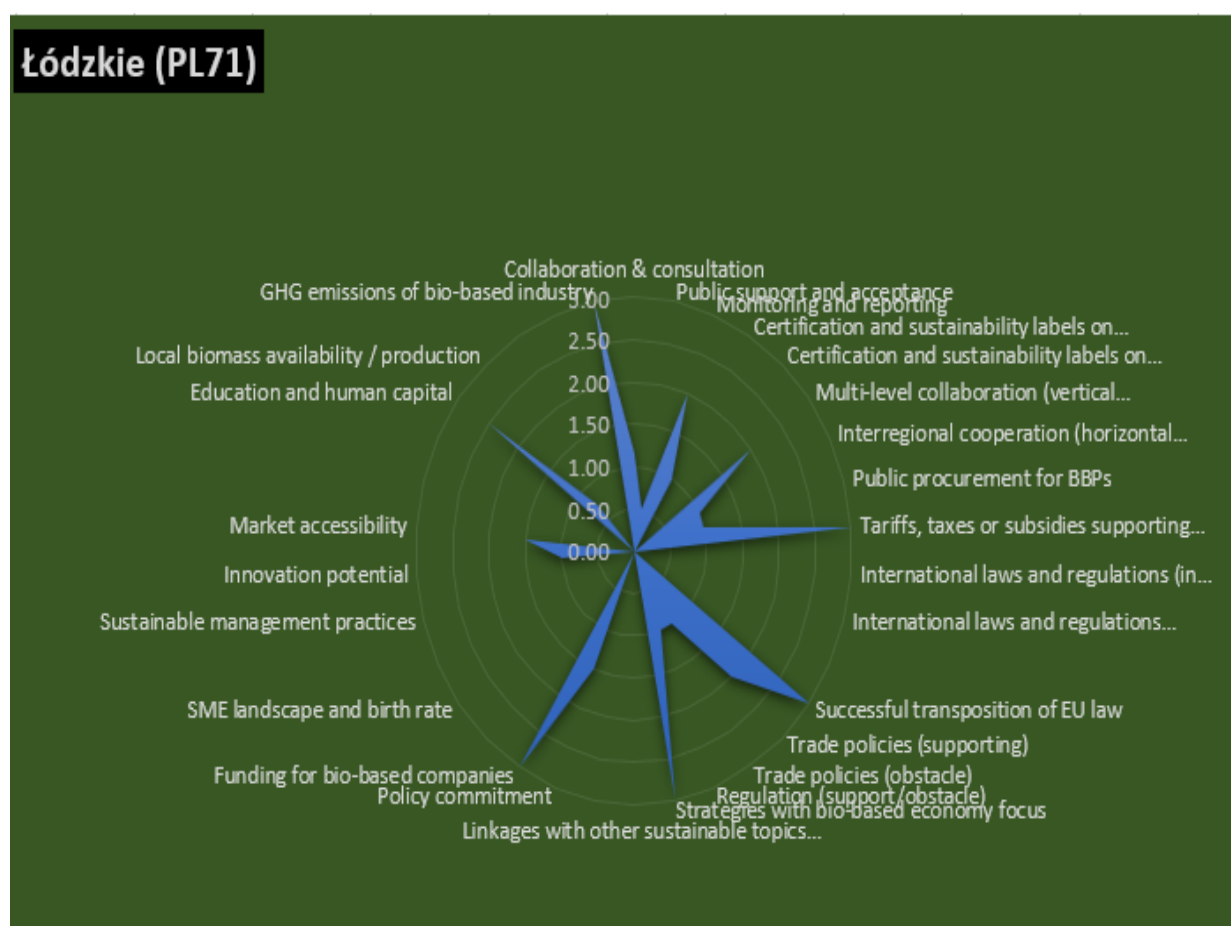


Figure 5 Performance of **Łódzkie** (fictive values) of the key performance indicators that lie beyond the 3 main governance functions (3rd tier of Governance Model)

4 ONLINE BERST DASHBOARD WITH GOVERNANCE INDICATORS

4.1 BACKGROUND VISUALISATION

The “BioEconomy Regional Strategy Toolkit” project (2011-2014; Van Leeuwen, 2016) launched the online BERST dashboard, which was further improved in the RDI2Club project (2018-2020). Annex 4 showcases the main features of that (anno 2020) dashboard (weblink: [Online BERST dashboard on Governance](#)). The BIOMODEL4REGIONS project has taken that version as starting point for storing, analysing and visualising governance indicators of its pilot regions in a user-friendly way². This advanced dashboard with governance indicators remains available for analysis until one year after duration of BIOMODEL4REGIONS and accessible for any EU country or region.

4.2 GOVERNANCE MODELS OF SIX BIOMODEL4REGIONS REGIONS

The online BERST governance dashboard employed in BIOMODEL4REGIONS ([Online BERST dashboard on Governance](#)) consists of quantitative indicators compiled from public data sources (like Eurostat, EC-JRC) and qualitative indicators compiled from regional stakeholders’ knowledge. These data gathered in the BIOMODEL4REGIONS project give insight into current status of governance key performance indicators for the six pilot regions. This status quo forms the base for a self-assessment analysis to identify which governance aspects perform well or less. To understand whether the obtained values indicate a ‘good’, ‘poor’ or ‘medium’ performance, the added benchmarks allow the scoring of specific assessment criteria (3rd tier) and of bioeconomy governance functions (2nd tier). Benchmarks come from literature reviews, project reports and studies as well as judgements of experts and regional stakeholders.

The online BERST governance dashboard can be entered by clicking on [Online BERST dashboard on Governance](#). It opens with a screen (Figure 6) that a.o. shows a series of predefined presentations for the six pilot regions on its left side.

² The BERST dashboard builds upon standard, certified SWING software (<https://swing.eu/content/Swing-Mosaic>) which has been designed to the BIOMODEL4REGIONS project in terms of style, contents of indicators, use of infographics, use of language (English). The dashboard is hosted by the Dutch software developer, ABF Research (www.abfresearch.nl). The data implementation and visualisation work was coordinated by WUR partner in the BIOMODEL4REGIONS project.

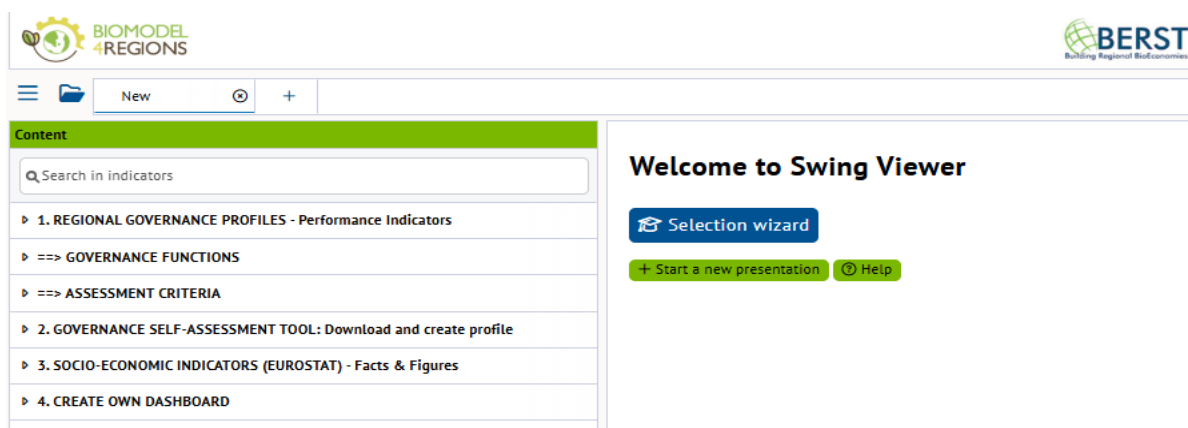


Figure 6 Opening screen of BERST governance dashboard with Selection wizard

The right side of the screen shows a blue bar indicating a 'Selection wizard' that guides the user through selection of specific indicators for a specific geographic area and period, and a presentation type. If you click on that blue bar, the user is first asked to select one or more indicators on the left, e.g. Regional Governance Profile for the Biofuels region (Figure 7), a geo region (Figure 8), a period (Figure 9) and (alternative) presentation types (Figure 10 and Figure 11).

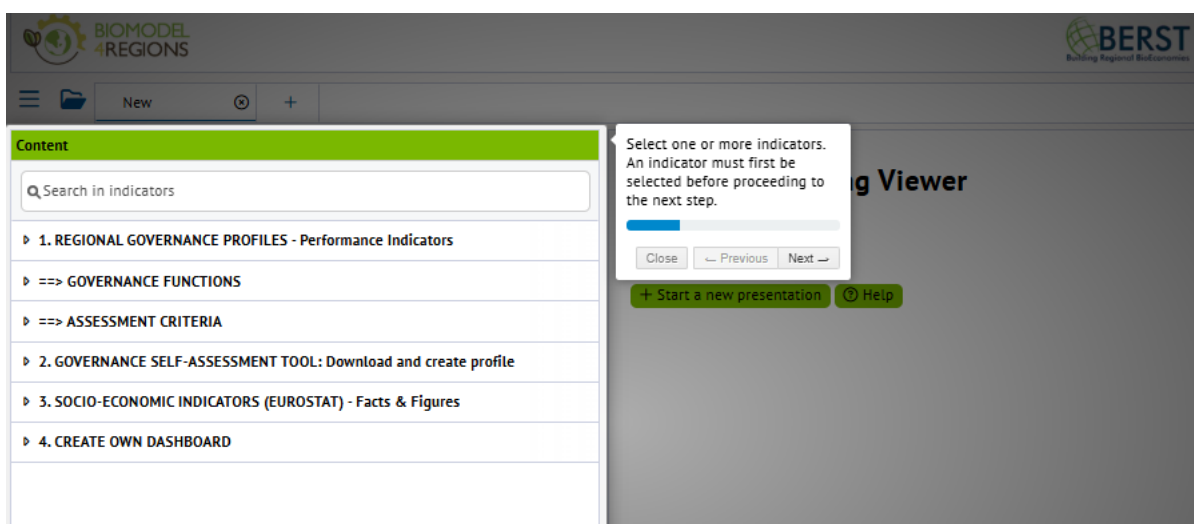


Figure 7 Selection of one or more indicators

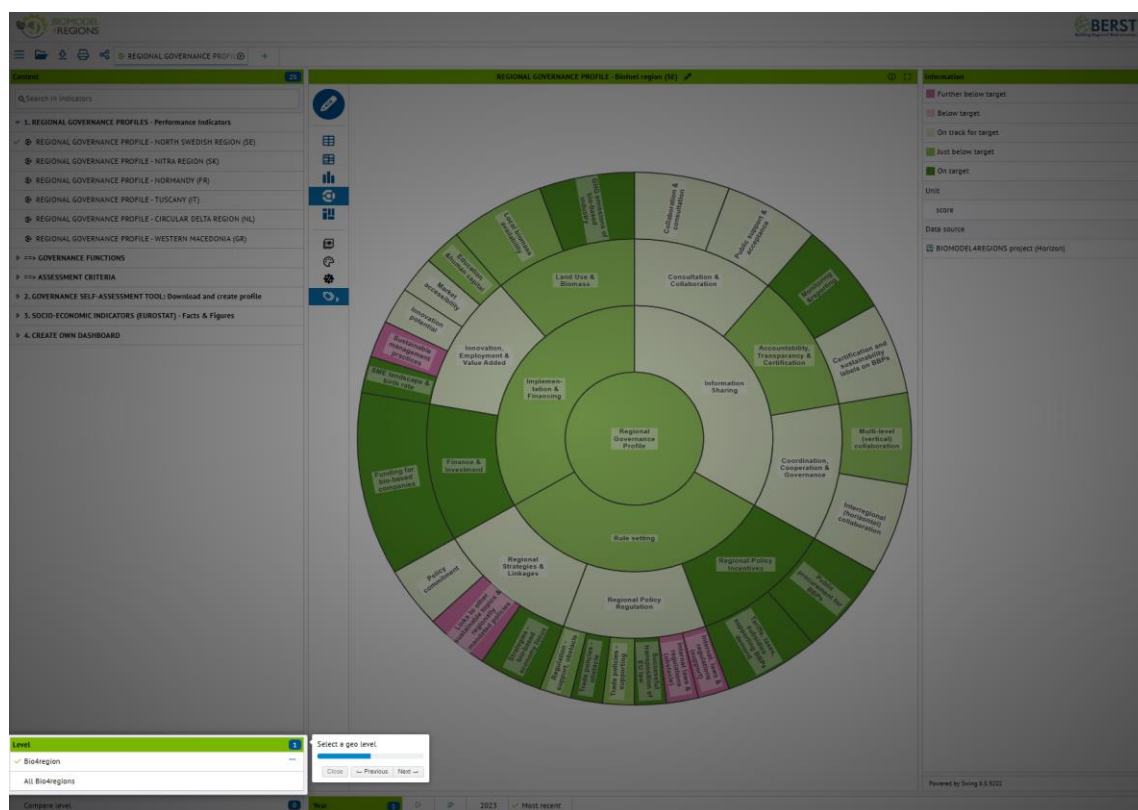


Figure 8 Selection of a geo level

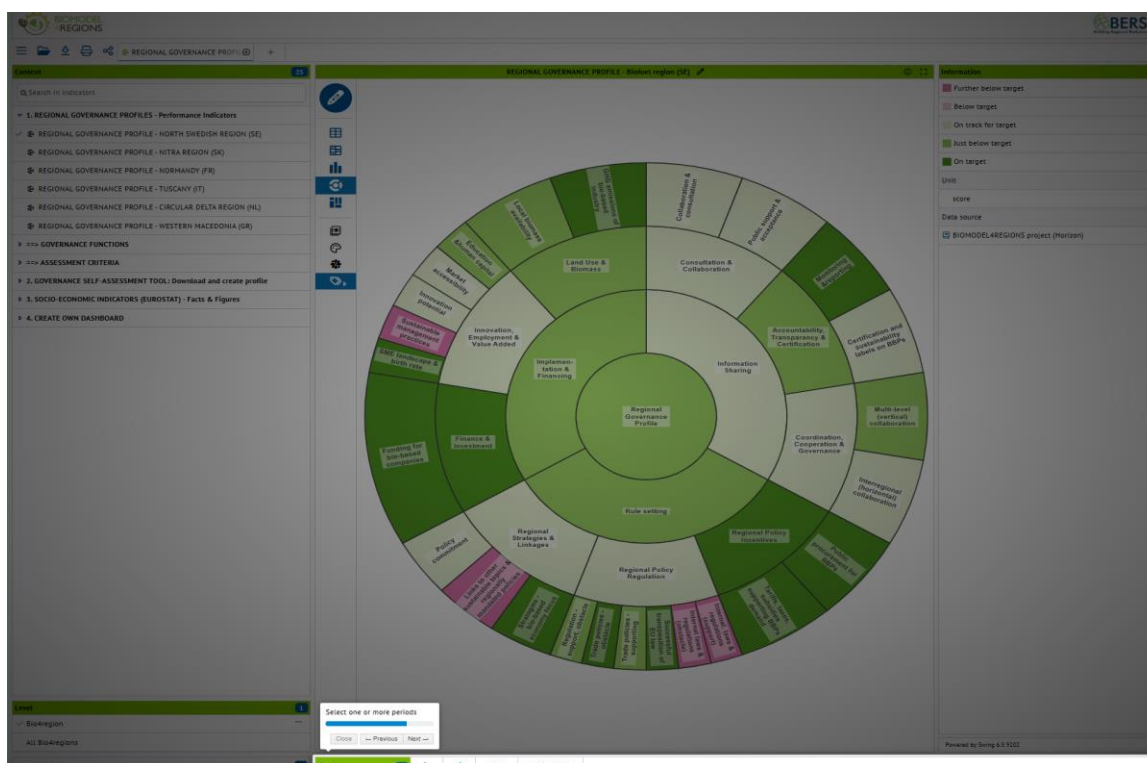


Figure 9 Selection of a period

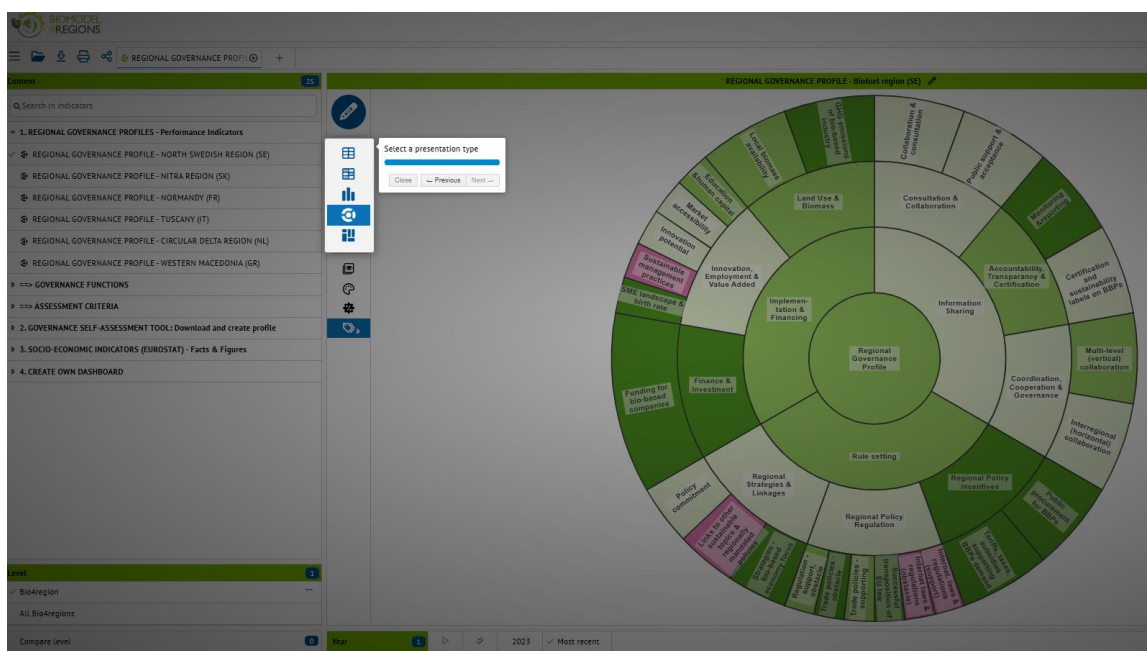


Figure 10 Selection of Pie as presentation form



Figure 11 Selection of Tree map as presentation form

As mentioned, the left side of the opening screen lists a series of key presentations on the governance profiles of the 6 pilot regions employed in BIOMODEL4REGIONS.

► 1. Regional Governance Profiles

The region's profiles are performed as a pie: the key performance governance indicators are in the upper circle, which are mapped to governance functions in the inner circles. The centre of the pie gives a number that can be considered as a Regional Governance Readiness level (Figure 12).



Figure 12 Regional Governance Profile for North Swedish region

In principle, prepared presentation form can be simply adapted (see also Selection Wizard):

1. Select a prepared presentation type (pie, spider) on the left column and the figure appears on the screen, e.g. Regional Governance Profile pie of the Biofuel region in Sweden.
2. Depending on size of laptop (or second device) the user can decide to show indicator and tier names and values in the pie. Descriptions might be too long which hinders readability.

Names can be deactivated via the  button in the vertical toolbar.

3. User can make other visualisation via the bar



4. Legend with colouring scores is on the right hand side and the user can change it .
5. Full size of pie/figure is shown by clicking on the right side, upper green bar button .
6. User can hover with the mouse over the figure.

→ Governance Functions

The 2nd tier of the governance model is visualised as a spider for each of the 3 governance functions and can be selected on the left side of the screen, e.g. for “Information sharing”. A spider appears on the screen with performance of the 6 pilot regions for this specific function (Figure 13).

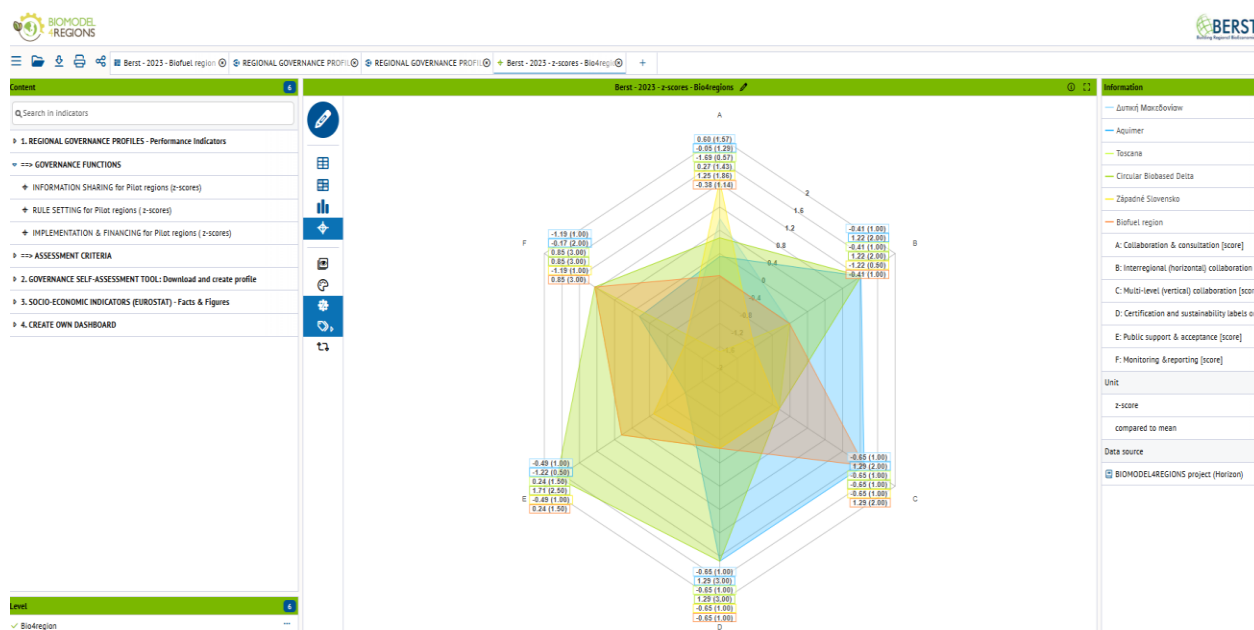


Figure 13 Performance of 6 pilot regions for Information Sharing function

➔ Assessment Criteria

The 3rd tier of the governance model are also visualised as spiders for each pilot region and can be selected on the left side of the screen, e.g. 3rd tier - Assessment criteria for Biofuel region (Figure 14).

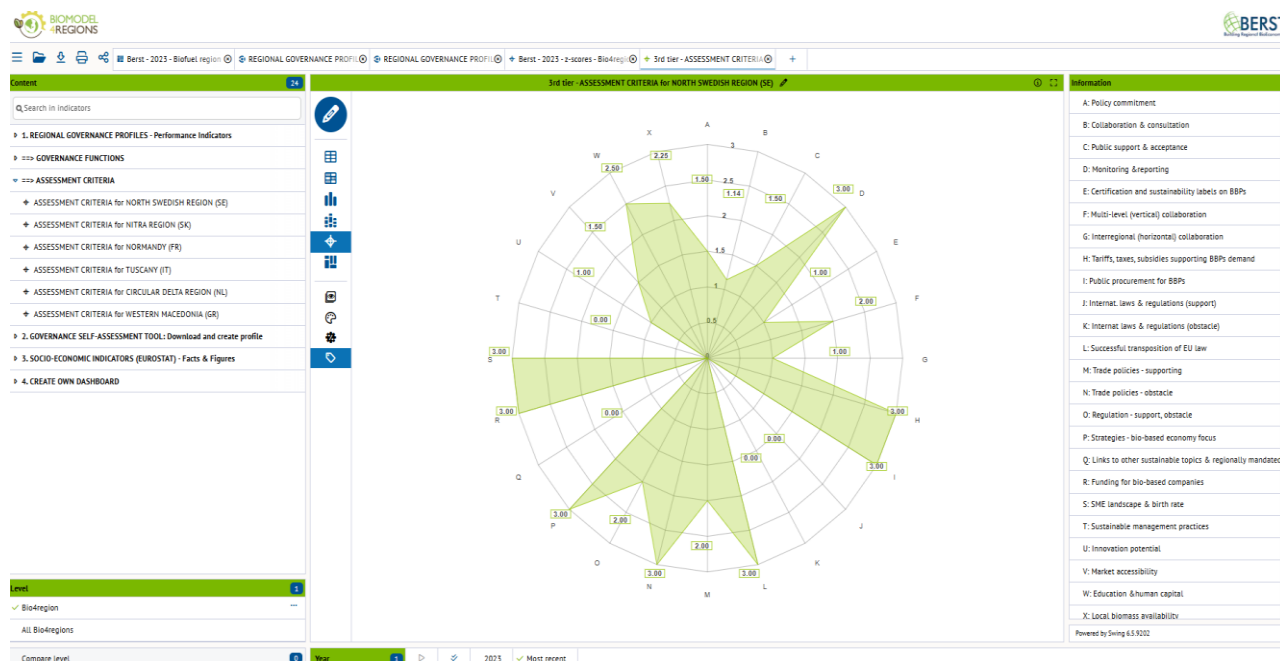


Figure 14 Performance of assessment governance functions for North Swedish region

► 3. Governance Self-Assessment Tool: Download and create profile

This theme gives any regional person the opportunity to download the Governance Self-Assessment Tool (G-SAT), to fill the indicators with data and to create the regional governance profile. The G-SAT is an Excel file and is accompanied with a Handbook how to use it (Figure 15).

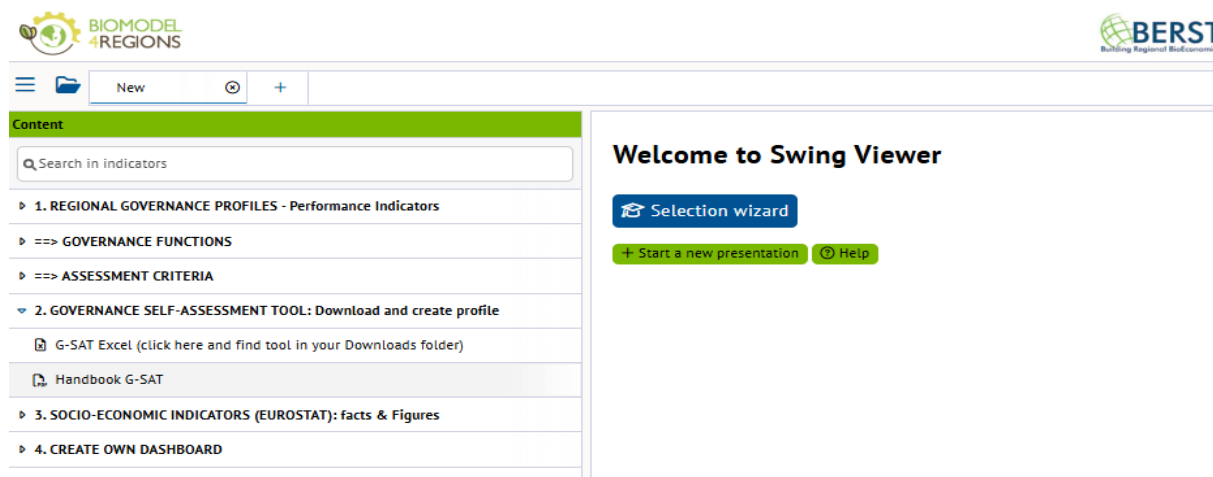


Figure 15 Governance Self-Assessment Tool for download and creation of governance profile for any NUTS2 region

G-SAT offers *any region* the opportunity to characterise its own governance model and to provide insight into its governance performance status today. The G-SAT includes the KPIs of the governance model that must be populated with regional specific data based on expertise from the region at stake. Steps:

1. Download the Handbook and the Excel file from the online BERST dashboard and read instructions.
2. Go to the '*Fill indicators*' tab in and a) select a NUTS2 region (in cell E1), and b) collect and fill region-specific values for the indicators (in column E).
3. Go to the '*Dashboard*' tab and inspect the self-generated graphs showing the governance performance of the selected region, benchmarked against the pilot regions in the BIOMODEL4REGIONS project.
4. Validate and discuss findings with regional experts and – if preferred - develop action and implementation plans to improve region's governance performance.

For a detailed description of the G-SAT, go to [Chapter 3](#) of this Handbook.

► 4. Socio-Economic Indicators (Eurostat) - Facts & Figures

This theme gives the user the opportunity to look at data for indicator(s) for any NUTS3 region and visualise these in a self-selected presentation form.

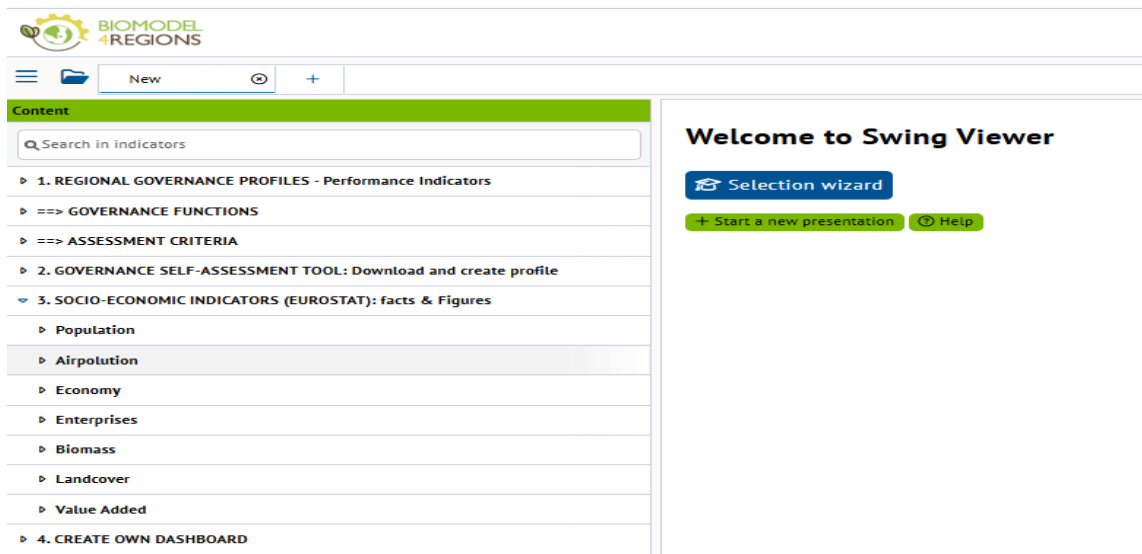


Figure 16 Indicators under theme ' Socio-economic indicators (Eurostat) – Facts & Figures

The right side of the screen shows again the blue bar for the 'Selection wizard' that guides the user through selection of specific indicators for a specific geographic area and period, and a presentation type. If user clicks on that blue bar, one must select one or more indicators on the left, population (Figure 17), a geo region, e.g. all NUTS2 regions (Figure 18), and a period (Figure 19).

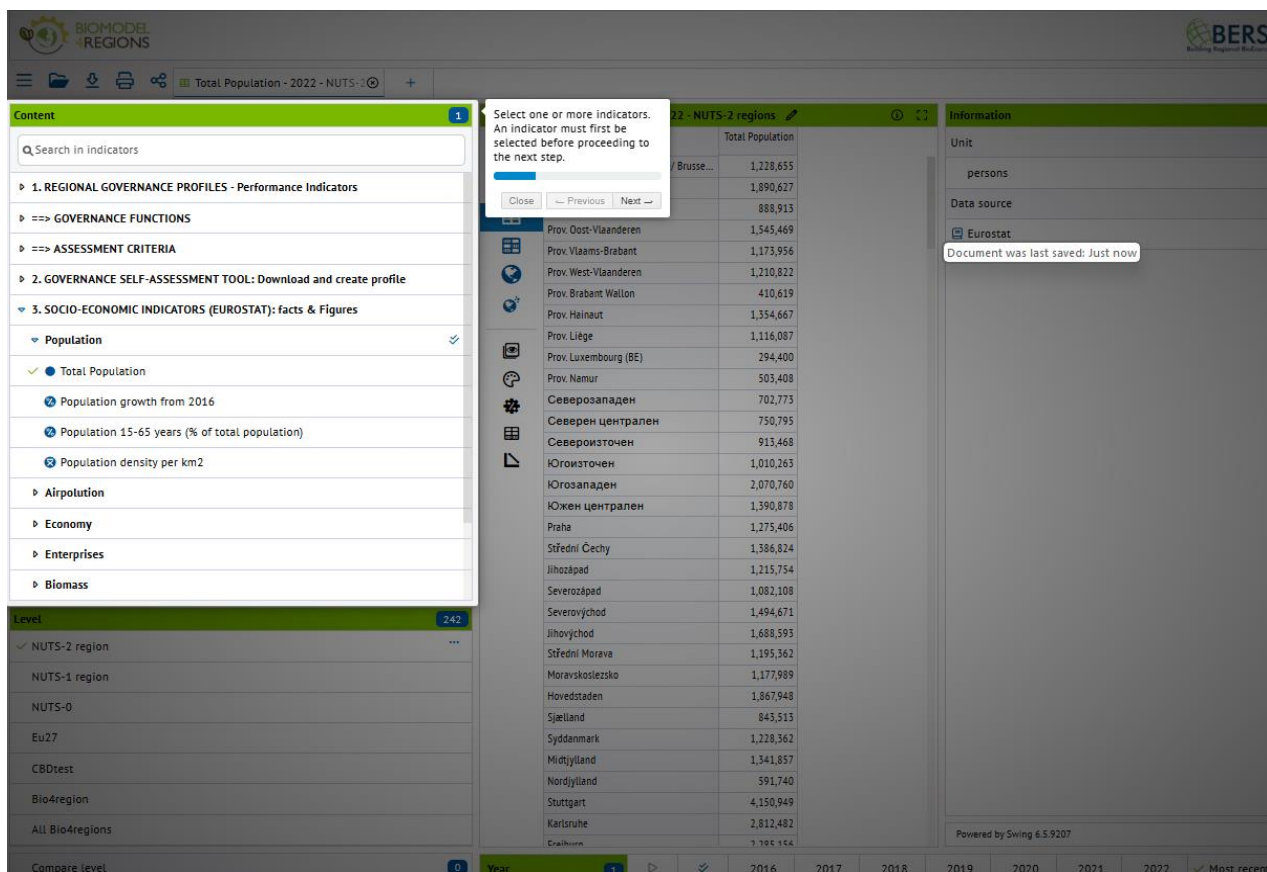


Figure 17 Selection of indicator(s)

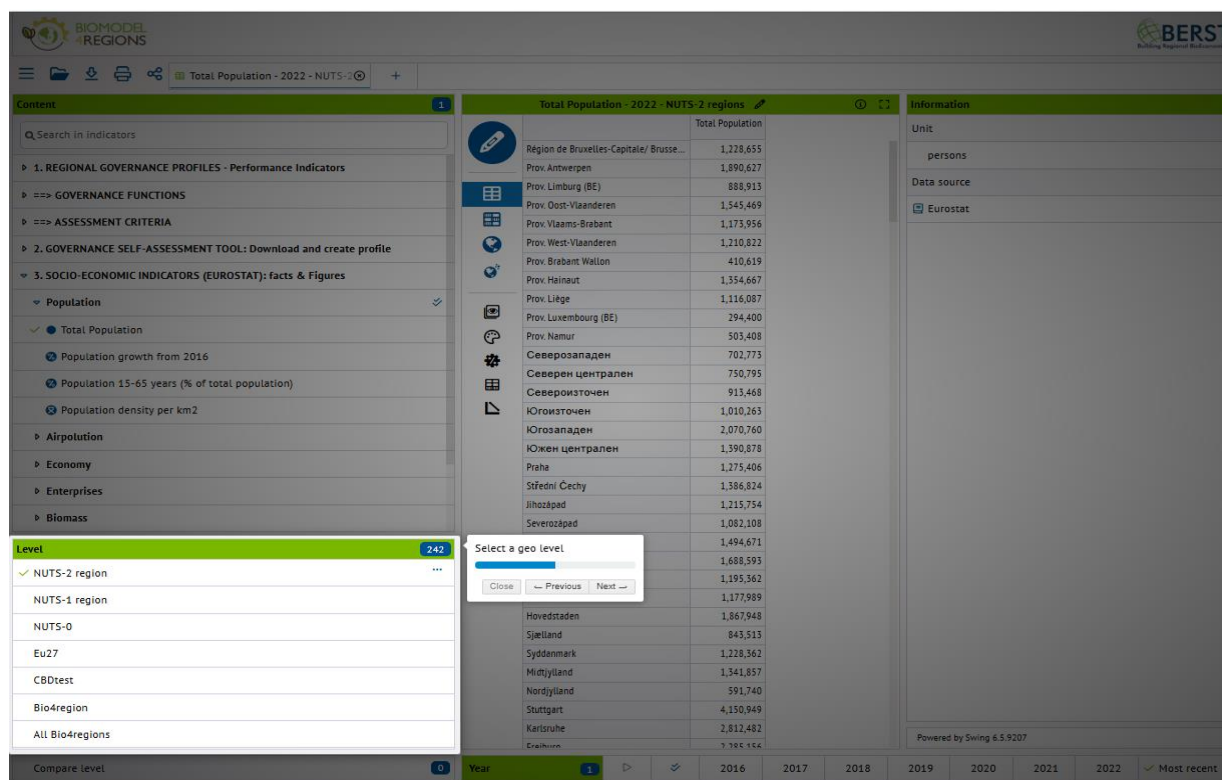


Figure 18 Selection of a geo level

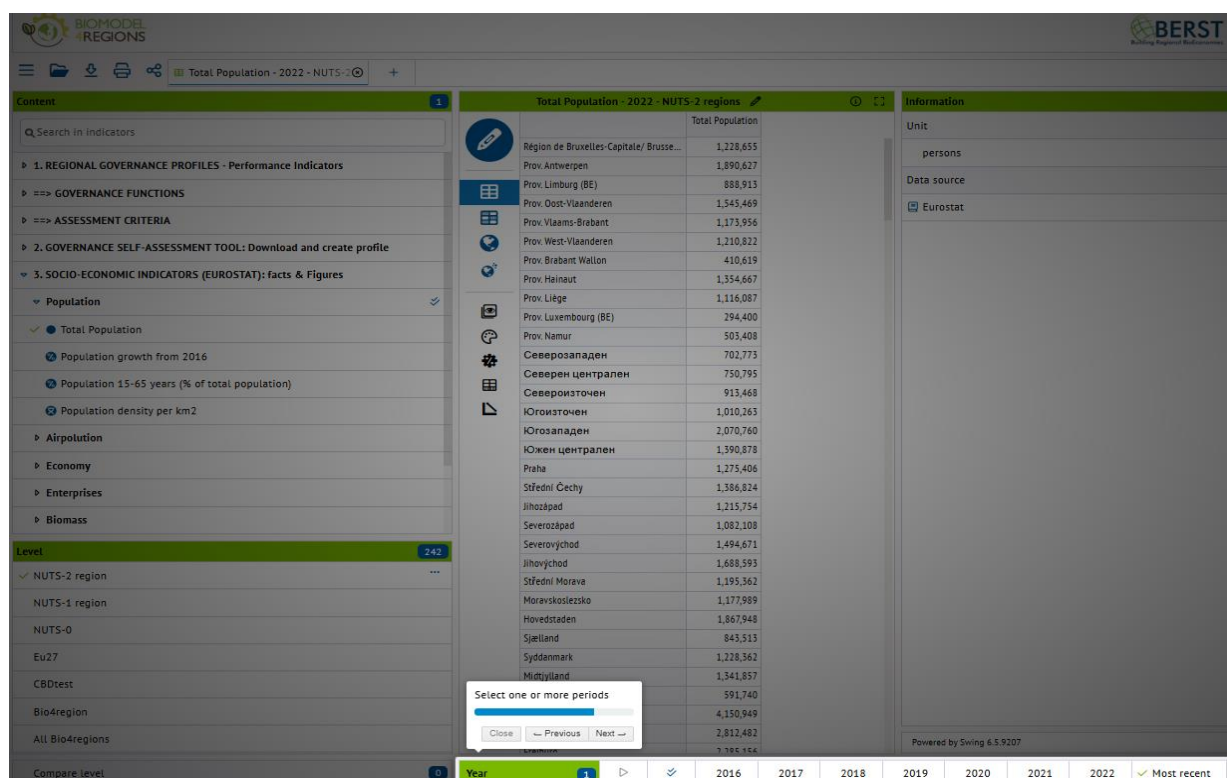


Figure 19 Selection of a period

► 4. Create own dashboard

This theme gives the user the opportunity to create an own dashboard³ as long as quantitative data are available at NUTS0 and NUTS2 level. If you click on 'Go to Dashboard' two tiles appear on the screen (Figure 20).

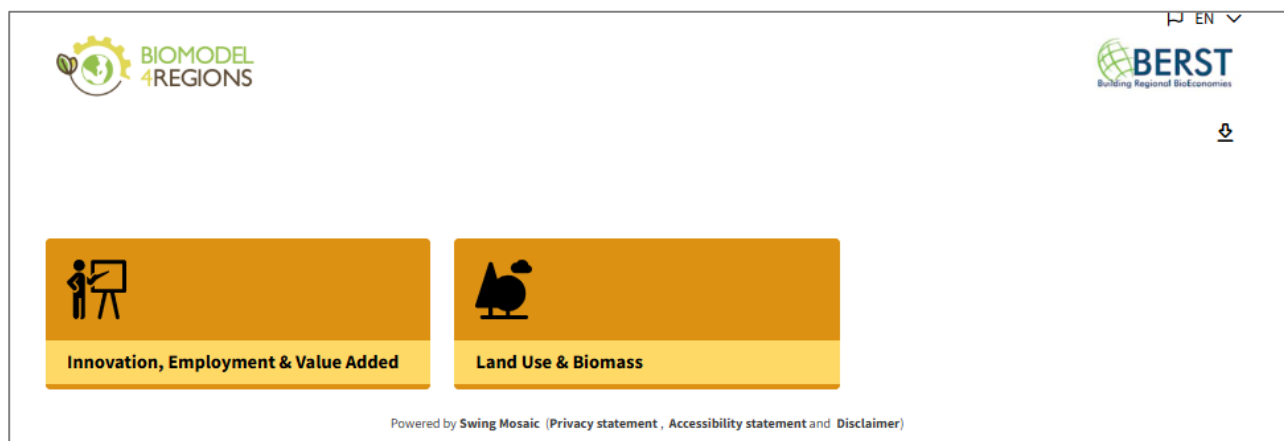


Figure 20 Opening screen of the governance dashboard

By clicking on the tile 'Land Use & Biomass', the user enters three tiles with sub-assessments, i.e. 'Biomass types', and 'Land use types' and 'Greenhouse Gas' (Figure 21).

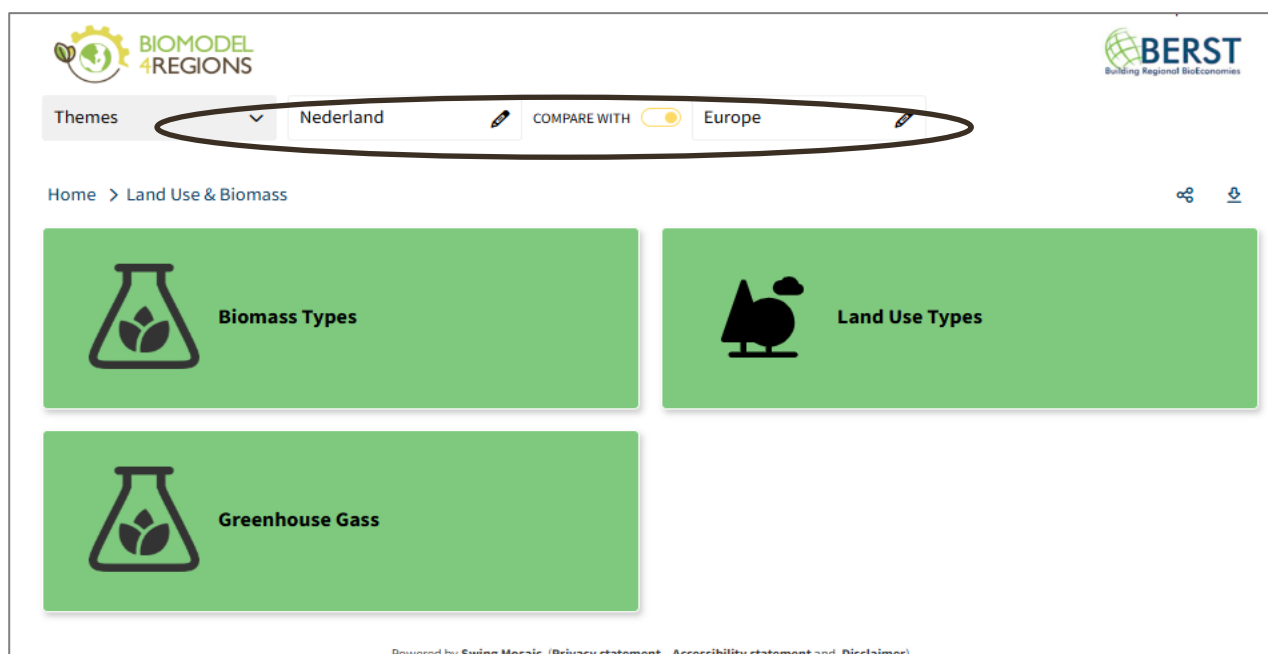


Figure 21 Sub-assessments of tile 'Land Use & Biomass'

³ The feature is powered by Swing Mosaic.

Next, by clicking on 'Land use types' in Figure 21, the user gets insight into the indicators of the governance framework (Figure 1) that are related to 'Biomass types', and 'Land use types' respectively (Figure 22).

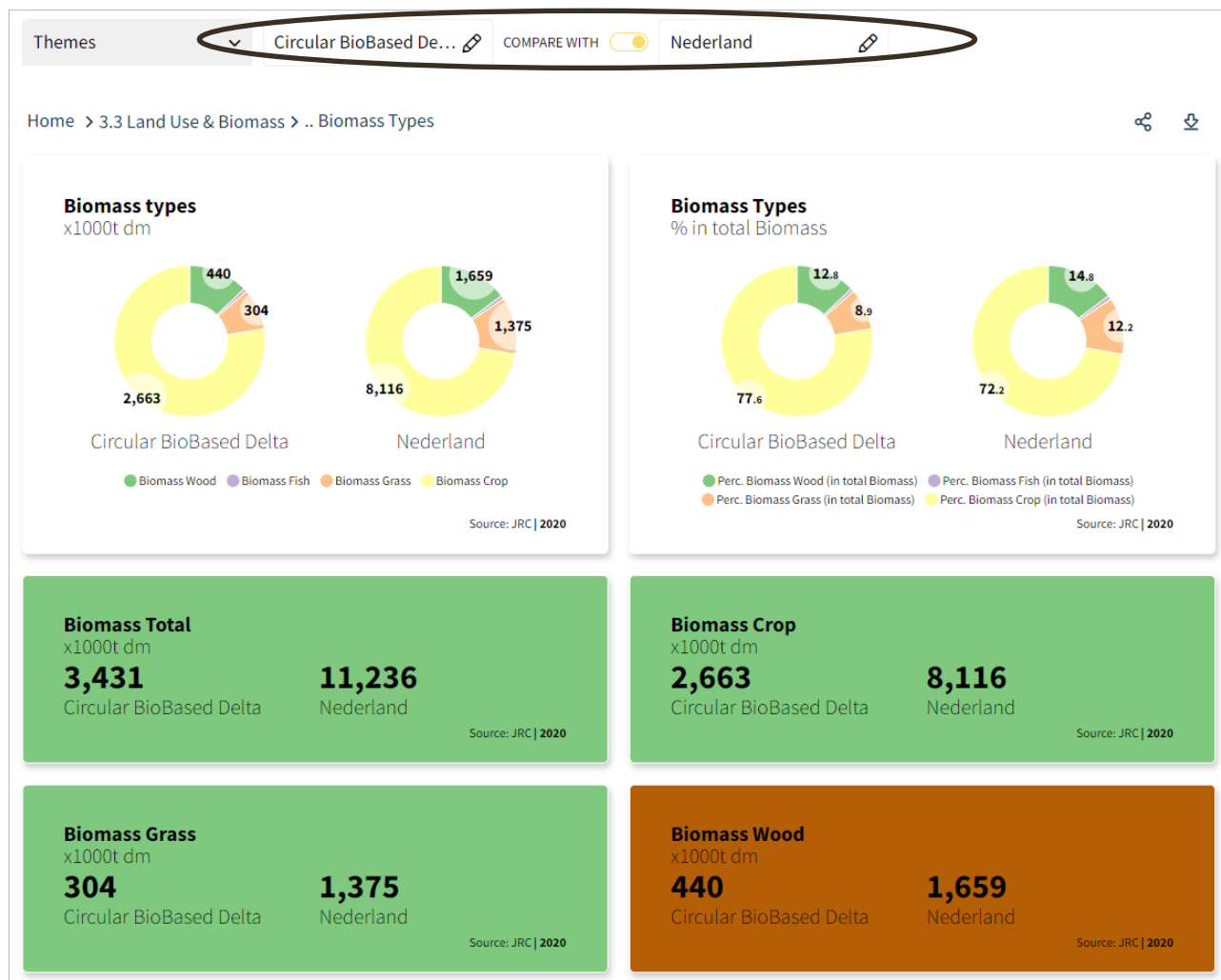


Figure 22 Biomass Types indicators with data for a region and the Netherlands

In this example the indicator values are reported for the CBBB pilot region in the BIOMODEL4REGIONS project, which are compared with values for the Netherlands. On top of the screen the user can select another region (or another comparison region) at NUTS0, NUTS2 or EU27 levels.

4.3 GOVERNANCE SELF-ASSESSMENT DATA FOR OTHER REGIONS

The Governance Self-Assessment Tool (G-SAT) as described in Chapter 3 has been developed to populate and structure governance indicators for any (NUTS2) region. This Excel file can be downloaded from the left side of the BERST governance dashboard (Figure 23) and is accompanied by a Handbook. When filled with data the Excel file provides similar graphs for visualising governance indicators as employed in the online BERST dashboard (see section 4.2).

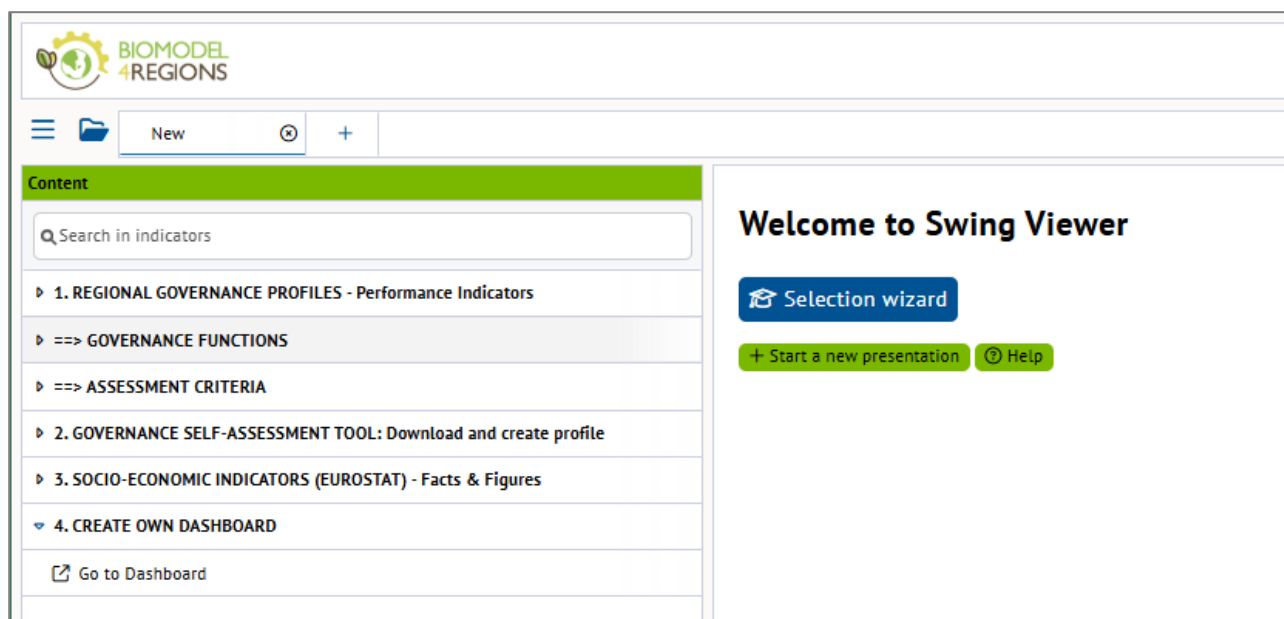


Figure 23 Create own dashboard option in online BERST tool

REFERENCES

- Andonova, L.B., Betsill, M.M., Bulkeley, H., 2009. Transnational Climate Governance [WWW Document]. <https://doi.org/10.1162/glep.2009.9.2.52>.
- Adriázola, P., Dellas, E., Tänzler, D., 2018. Multi-Level Climate Governance Supporting Local Action. Instruments enhancing climate change mitigation and adaptation at the local level.
- Haberl, H., Fischer-Kowalski, M., Krausmann, F., Winiwarter, V. (Eds.), 2016. Social ecology: society-nature relations across time and space, Human-environment interactions. Springer, Switzerland.
- Jänicke, M., 2015. Horizontal and Vertical Reinforcement in Global Climate Governance. *Energies* 8, 5782–5799. <https://doi.org/10.3390/en8065782>.
- Jänicke, M., Lindemann, S., 2010. Governing environmental innovations. *Environ. Polit.* 19, 127–141. <https://doi.org/10.1080/09644010903396150>.
- Pauliuk, S., Arvesen, A., Stadler, K., Hertwich, E.G., 2017. Industrial ecology in integrated assessment models - Nature Climate Change. *Nat. Clim. Change* 7, 13–20. <https://doi.org/10.1038/nclimate3148>.
- BERST dashboard (2020). <https://berst.databank.nl/dashboard/en-gb/dashboard/>.
- SWING software. <https://swing.eu/content/Swing-Mosaic>.
- Van Leeuwen, M. (2016) BERST lessons and findings. Presentation on the Workshop 'EU Cohesion policy regions: the potential of biomass to bio-based products'; 8-9 September 2016, Brussels. Wageningen Economic Research.
- Voinov, A., Jenni, K., Gray, S., Kolagani, N., Glynn, P.D., Bommel, P., Prell, C., Zellner, M., Paolisso, M., Jordan, R. and Sterling, E., 2018. Tools and methods in participatory modelling: Selecting the right tool for the job. *Environmental Modelling & Software*, 109, pp.232-255.

ANNEX I GOVERNANCE KEY PERFORMANCE INDICATORS

Table A1-1 Governance KPIs selected to characterize the governance model of pilot regions

Governance field	Assessment criteria	Indicator
1.1 Consultation, collaboration, information flows across groups	1.1.1 Degree of collaboration & consultation	Presence of cluster organisation; industrial networks/PPP; collaboration with universities or research, H2020/CBI-JU/HORIZON, macro-regional projects; companies in bioeconomy cluster; biocluster integrated in science park
	1.1.2 Public support & acceptance	Campaigns/events to raise awareness on bioeconomy; public support and acceptance
1.2 Accountability, transparency, certification and award schemes	1.2.1 Monitoring and reporting	Monitoring and reporting on the bio-based economy
	1.2.2 Certification and sustainability labels on BPPS	Certification and sustainability labels on BPPS in place
	1.2.3 Sustainability management structures	Certification and labels explaining footprints of BBPs; Share of companies with sustainability credentials
1.3 Coordination, cooperation & multi-level governance	1.3.1 Multi-level collaboration (vertical)	Existence of Inter-ministerial cooperation to develop bioeconomy; Intensity of inter-ministerial forums
	1.3.2 Interregional cooperation (horizontal)	Existence of Interregional cooperation to develop bioeconomy; Intensity of interregional forums; Existence of dedicated administrative department to develop the bioeconomy
2.1 Regional policy incentives	2.1.1 Public procurements for BBPs	Bio-based public procurement policy; Tenders with bio-based requirements in procurement
	2.1.2 Taxes or subsidies supporting demand for BBPs	Policy incentives (tax, subsidies) supporting demand of bio-based products
2.2 Regional policy regulation	2.2.1 International laws and regulations (in support/obstacles)	Binding international laws & regulations (supporting bio-based economy) – qualitative description; Successful transposition of European laws and regulations that link to bio-based economy.
	2.2.2 Trade policies (in support/obstacles)	Trade policies (supporting bio-based economy); Trade policies (obstacles for bio-based economy)
	2.2.3 Other policies (in support/obstacles)	Trade policies (supporting bio-based economy); Trade policies (obstacles for bio-based economy); Policy regulations in place (supporting bio-based economy); Policy regulations in place (obstacles for bio-based economy) Policy regulations in place (supporting supply of bio-based economy); Policy regulations in place (obstacles for bio-based economy)

2.3 Regional strategy and regional linkages	2.3.1 Strategies with bioeconomy focus	Dedicated regional bioeconomy strategies
	2.3.2 Degree of complementary with other sustainability topics	Regional strategies with links to bioeconomy and bio-based economy
	2.3.3 Policy commitment	Number of government departments and agencies involved in bioeconomy strategy roll-out/implementation; Policy commitment to bioeconomy and bio-based economy strategy implementation through in media
3.1 Finance & investment	3.1.1 Funding for bio-based companies	Access to private funds used by the biobased companies; Access to public funds used by the biobased companies
	3.1.2 Availability of private/public funding	Availability of private funding; Availability of public funding
3.2 Innovation, employment & value added	3.2.1 SME landscape and birth rate	Bio-based SME birth rate; Presence of incubator
	3.2.2 Employment structure	Total regional employment; total employment of total regional industry; total bio-based industry employment Total regional companies; total companies in total regional industry; total biobased companies
	3.2.3 Value Added	Bio-based value added specific by sector; Share value added of the selected bio-based sector in the overall regional bio-based economy; Share value added of the selected bio-based sector in regional industry (fb and bb)
	3.2.4 Sustainable management practices	Regional guidance on sustainability practices for bio-based economy sector; Carbon food print/Certification scheme; GHG emissions per selected sector
	3.2.5 Innovation potential	R&D expenditure; Pilot and Demonstration facilities; Intellectual property rights
	3.2.6 Market accessibility	Level playing field; Licensing new permits indirectly linked to BBPs (e.g. building permits etc.); Licensing new permits directly linked to BBP; Existence of good practices for developing regional bioeconomy
	3.2.7 Future workforce	Pre-school education programs; Primary education programs; Secondary education programs; Tertiary education programs; Number of vocational programmes on bio-based economy; Presence of human capital agenda
3.3 Biomass & land use availability	3.3.1 Local biomass production	Agricultural biomass production; Blue biomass production; Forestry biomass production; Waste production; Biomass gap; Presence of continuous supply of biomass with constant

		quality; Resource (incl. water and soil) and energy efficiency practices
	3.3.2 Land use patterns	Land-use change; forestry land density; agricultural & horticultural land density; total forestry land; total agricultural & horticultural land; GHG emissions per sector

Annex 2 gives a complete overview of the selected governance indicators in terms of definition, metrics, data source, geographic and temporal scope, and position in the governance model framework.

ANNEX 2 META INFORMATION ON GOVERNANCE INDICATORS

This annex gives insight in meta information about the governance indicators: name of the indicator, how it is constructed, how it is measured (metrics), and where the information comes from. Note that a tick in the last 2 columns means that data for the indicator is already available from other sources, such as Eurostat.

Note that it is the responsibility of BIOMODEL4REGIONS pilot regions, or for any region in general, in gathering data at the geographical and sectoral levels in case regular statistical sources (such as Eurostat) don't provide figures, e.g., by obtaining the data from regional sources, stakeholder interviews, or – in the exceptional stage – by making guestimates.

Table A1-1 Meta information on governance indicators to be collected

Indicator name	Description and/or construction of indicator	Unit	Source	Data availability	
				NUTS0	NUS2
Degree of collaboration & consultation (1.1.1)					
Presence of cluster organisation	Indicates of a cluster organisation exists in the regional and sectoral scope of the pilot region	yes/no	Partner knowledge		
Collaboration with H2020/CBI-JU/HORIZON,	Indicates the number of projects related to the bioeconomy with macro/interregional scope and involvement (i.e., involving more than one nuts2 region in the country)	number	Partner knowledge		
Collaboration with macro-regional projects	Indicates the number of on-going European projects related to the bioeconomy in specified year and related to the regional and sectoral scope of the pilot region	number	Partner knowledge		
Biocluster integrated in science park	Identifies if biocluster is connected to a science park and the diversity of business linked to it, e.g. (mix of) private companies, R&D centres, technical institutes, universities	number	Partner knowledge		
Public support & acceptance (1.1.2)					
Campaigns/events to raise awareness on bioeconomy;	Number of awareness raising activities related to the bioeconomy	number	Partner knowledge		
Public support and acceptance	Represents a subjective self-assessment to grade the received degree of public acceptance towards bio-based products I the pilot region. This might not in all cases be distinguishable from support to bioeconomy in a wider sense	Very high/high/medium/low/very low/none	Partner knowledge		
Monitoring and reporting (1.2.1)					
Monitoring and reporting on the bio-based economy in place	Identifies whether or not a monitoring system are in place at the regional level to monitor and evaluate the implementation/performance of the bio-based economy	Absent/considered/in preparation/published/revised	Partner knowledge		
Certification and sustainability labels on BBPs (1.2.2)					
Certification and sustainability labels on bio-based products in place	Certifications and labels with focus on carbon footprints of bio-based products	number	Partner knowledge		
Multi-level collaboration (vertical) (1.3.1)					



Existence of Interministerial cooperation to develop bioeconomy	Existence of Interministerial cooperation to develop bioeconomy	Binary	Partner knowledge		
Intensity of inter-ministerial forums	Number of inter-ministerial forums in the pilot region	Number	Partner knowledge		
Interregional cooperation (horizontal) (1.3.2)					
Existence of inter-regional cooperation to develop bioeconomy	Identification of the type of established forums along the proposed typology	In place/absent	Partner knowledge		
Intensity of inter-ministerial cooperation to develop bioeconomy	Number of inter-regional forums in the pilot region	Number	Partner knowledge		
Public procurements for BBPs (2.1.1)					
Biobased public procurement policy	Public procurement can support the market take-up of new products. Measures if bio-based public procurement policy is in place	Absent/considered/in preparation/published/revised	Partner knowledge		
Taxes or subsidies supporting demand for BBPs (2.1.2)					
Policy incentives (tax, subsidies) supporting demand of bio-based products	Measures if demand for bio-based products is promoted through financial instruments on national/regional level	Absent/considered/in preparation/published/revised	Partner knowledge		
International laws and regulations (in support/obstacles) (2.2.1)					
Binding international laws & regulations (supporting bio-based economy)	Qualitative description that lists the English title (including reference, numbers, etc) of the policy document as well as a short description of why it is supporting the bio-based economy in the region	Qualitative description	Partner knowledge		
Binding international laws & regulations (supporting bio-based economy)	Identifies to which degree international laws and regulations positively influence the development on the regional bioeconomy.	Very high/high/medium/low/very low/none	Partner knowledge		

Binding international laws & regulations (obstacle for bio-based economy)	Qualitative description that list the English title (including reference, numbers, etc) of the policy document as well as a short description of why it is hindering the bio-based economy in the region	Qualitative description	Partner knowledge		
Binding international laws & regulations (obstacle for bio-based economy)	Identifies to which degree international laws and regulations negatively influence the development on the regional bioeconomy.	Very high/high/medium/low/very low/none	Partner knowledge		
Successful transposition of European laws and regulations that link to bio-based economy	Measures how successful EU laws that impact on the bio-based economy are being transposed within the country/region	Very high/high/medium/low/very low/none	Partner knowledge		
Trade policies (in support/obstacles) (2.2.2)					
Trade policies (supporting bio-based economy)	As a specific type of international law might support the development of the bio-based economy. E.g., if biomass need to be imported or the biobased product is primarily of interest in the international market	Very high/high/medium/low/very low/none	Partner knowledge		
Trade policies (obstacle bio-based economy)	As a specific type of international law might hinder the development of the bio-based economy. E.g., if biomass need to be imported or the biobased product is primarily of interest in the international market	Very high/high/medium/low/very low/none	Partner knowledge		
Other policies (in support/obstacles) (2.2.3)					
Trade policies (supporting bio-based economy)	Qualitative description that lists the English title (including reference, numbers, etc) of the policy document as well as a short description of why it is supporting the bio-based economy in the region	Qualitative description	Partner knowledge		
Trade policies (obstacle bio-based economy)	Qualitative description that lists the English title (including reference, numbers, etc) of the policy document as well as a short description of why it is hindering the bio-based economy in the region	Qualitative description	Partner knowledge		
Policy regulations in place (supporting bio-based economy)	National, regional or European policies that support the development of the bio-based economy (e.g., supply or processing)	Very high/high/medium/low/very low/none	Partner knowledge		

Policy regulations in place (obstacle for bio-based economy)	National, regional or European policies that hinder the development of the bio-based economy (e.g., supply or processing)	Very high/high/medium/low/very low/none	Partner knowledge		
Policy regulations in place (supporting bio-based economy)	Qualitative description that lists the English title (including reference, numbers, etc) of the policy document as well as a short description of why it is supporting the bio-based economy in the region	Qualitative description	Partner knowledge		
Policy regulations in place (obstacle for bio-based economy)	Qualitative description that lists the English title (including reference, numbers, etc) of the policy document as well as a short description of why it is hindering the bio-based economy in the region	Qualitative description	Partner knowledge		
Strategies with bioeconomy focus (2.3.1)					
Dedicated regional bioeconomy strategies	Regional bioeconomy strategies are in many cases strongly interlined with bio-based economy. Indicators measures if these strategies are in place	Absent/considered/in preparation/published/revised	Partner knowledge		
Degree of complementary with other sustainability topics (2.3.2)					
Regional strategies with links to bioeconomy and bio-based economy	Quantifies all regional policies, strategies and instruments that link to goals of the bioeconomy	Number	Partner knowledge		
Policy commitment (2.3.3)					
Government departments and agencies involved in bioeconomy strategy roll-out/implementation	Measures all regional government departments, or related agencies that are involved in the development and/or roll-out /implementation of the bioeconomy	Number	Partner knowledge		
Policy commitment to bioeconomy and bio-based economy strategy implementation through media	Quantifies the different channels information on the bio-based economy was shared. It may include a variety of channels (social media, newspaper etc) and stakeholders by policy makers and institutions (governmental agencies, ministries, etc)	Very high/high/medium/low/very low/none	Partner knowledge		
Funding for bio-based companies (3.1.1)					
Access to private funds used by bio-based companies	Funding opportunities will support the establishment of bio-based companies. Measures qualitatively the access to	Very high/high/medium/low/very low/none	Partner knowledge		

	private funding in the specific sectoral and regional focus of the pilot region	um/low/very low/none			
Access to public funds used by bio-based companies	Funding opportunities will support the establishment of bio-based companies. Measures qualitatively the access to public funding in the specific sectoral and regional focus of the pilot region	Very high/high/medium/low/very low/none	Partner knowledge		
SME landscape and birth rate (3.2.1)					
Presence of incubator	Incubators may support the link between innovation to market. Indicator measures if an incubator exists and it is actively promoting the bio-based economy	Yes/no	Partner knowledge		
Sustainable management practices (3.2.4)					
Regional guidance on sustainability practices for bio-based economy sector	Implementation of governance along ecological, economic and social criteria can measure the existence of regional guidance, support schemes, etc	Absent/considered/in preparation/published/revised	Partner knowledge		
Innovation potential (3.2.5)					
R&D expenditure	Indicates the general innovation landscape and hint at favouring or limiting conditions	Mio euro	Regional Innovation Scoreboard; Innovation Union Scoreboard; Chamber of Commerce	√	√?
Pilot and Demonstration facilities	Represent bridges between generating basic knowledge and technological breakthroughs, and industrial applications and commercial adoption. Estimates the number of pilots and demonstration facilities in the pilot region	Absent/considered/in preparation/published/revised	Regional Innovation Scoreboard; Innovation Union Scoreboard; Chamber of Commerce	√	√?
Intellectual property rights	Patented regional bio-based products gives indication on the innovation of the market	Number	Regional Innovation Scoreboard; Innovation Union Scoreboard;	√	√?

			Chamber of Commerce		
Market accessibility (3.2.6)					
Level playing field	Measures if bioeconomy is equally supported as the fossil-based economy by the institutions	Very high/high/medium/low/very low/none	Regional Innovation Scoreboard; Innovation Union Scoreboard; Chamber of Commerce		
Licensing new permits indirectly linked to bio-based products (e.g., building permits etc)	Indication of bureaucracy burden, given by qualitative description on the process of permits indirectly linked to bio-based products	Very high/high/medium/low/very low/none	Partner knowledge		
Existence of good practices for developing regional bioeconomy	Indication that good practices are helpful to develop bioeconomy in the region	Yes/no	Partner knowledge		
Future workforce (3.2.8)					
Pre-school education programs	Programmes that inform and teach on bioeconomy and bio-based economy	Number	National/regional statistics	v	
Primary education programs	Programmes that inform and teach on bioeconomy and bio-based economy	Number	National/regional statistics	v	
Secondary education programs	Programmes that inform and teach on bioeconomy and bio-based economy	Number	National/regional statistics	v	
Tertiary and vocational education programs	Programmes that inform and teach on bioeconomy and bio-based economy	Number	National/regional statistics	v	
Presence of human capital agenda	Identifies and tackles the discrepancies in the labour market on demand and supply in personnel	Absent/considered/in preparation/published/revised	Partner knowledge		
Local biomass production (3.3.1)					
Agricultural biomass production	Linked to regional and sectoral focus in the pilot region	1000t dm	JRC (DataM)	√	
Blue biomass production	Linked to regional and sectoral focus in the pilot region	1000t dm	JRC (DataM)	√	

Forestry biomass production	Linked to regional and sectoral focus in the pilot region	1000t dm	JRC (DataM)	√	
Waste production	Linked to regional and sectoral focus in the pilot region	1000 m3?			
Land use patterns (3.3.2)					
Greenhouse gases in the regional biobased sector	Indicates the CO2 emissions in the sectoral and regional focus of the pilot region	Tonnes CO2eq	Eurostat	√	√

ANNEX 3 DATA COLLECTION AT REGIONAL LEVEL

As each geographical region and economic sector have unique administrative codes, harmonisation and consistency of data on a specific indicator is guaranteed as long as data is regularly reported in public statistics (e.g., 'agricultural land use in region x', 'population in region x'). If data on a specific indicator is not available in statistics, which is mostly the case for qualitative indicators (e.g., 'availability of public funding in region x' or 'collaboration with universities or research in region x', 'collaboration in H2020/CBI-JU/HORIZON projects in region x'), the data should come from primary data collection methods (interviews, surveys, etc). A challenge is to get information about these qualitative indicators at the systems boundaries - determined geographical region(s) and economic sector(s) – of the studied regions. Therefore, before collecting data of the selected KPIs at the regional level, the geographical and sectoral scopes were defined. Data collection for each indicator was fit to these boundaries in order to depict a balanced picture of the actual governance structure of a region. Note that a 'region' can cover more than one nuts region or more than one sector (NACE). For example, the boundaries of the 6 pilot regions in the BIOMODEL4REGIONS project are provided in Table A3-1.

Table A3-1 Geographical and sectoral scope (with statistical codes) in pilots

Region	geographical coverage (NUTS)	Sectoral coverage (NACE)
Delta Region Southwest (NL)	Zuid-Holland (NL33), Zeeland (NL34), Noord-Brabant (NL41)	Agriculture (A01), Forestry (A02), Fishery (A03), Manufacture of food products (C10), Manufacture of beverages (C11), Manufacture of tobacco products (C12), Manufacture of textiles (C13), Manufacture of chemicals & chemical products (C20), Manufacture of pharmaceutical products (C21), Manufacture of rubber and plastic products (C22), Manufacture of furniture (C31), Electricity, gas, steam and air conditioning supply (D), Waste collection, treatment and disposal activities, materials recovery (E38), Construction of buildings (F41), Specialized construction activities (F43)
Bioeconomy cluster (SK)	Západné Slovensko (SK02)	Waste collection, treatment and disposal activities, materials recovery (E38)
North Swedish region (SE)	Mellersta Norrland (SE32), Övre Norrland (SE33)	Forestry (A02), Manufacture of Paper and paper products (C17), Manufacture of pharmaceutical products (C21), Electricity, gas, steam and air conditioning supply (D)



Aquimer region (FR)	Basse-Normandie (FRD1), Haute-Normandie (FRD2)	Fishery (A03), Manufacture of food products (C10), Manufacture of chemicals & chemical products (C20), Waste collection, treatment and disposal activities, materials recovery (E38), Construction of buildings (F41),
Spring region (IT)	Toscana (ITI10)	Agriculture (A01), Forestry (A02), Fishery (A03), Manufacture of food products (C10), Manufacture of textiles (C13), Manufacture of wood and products of wood (C16), Manufacture of paper and paper products (C17), Manufacture of chemicals and chemical products (C20), Manufacture of rubber and plastic products (C22), Electricity, gas, steam and air conditioning supply (D), Waste collection, treatment and disposal activities, materials recovery (E38)
CLUBE region (GR)	Dytiki Makedonia (EL53)	Agriculture (A01), Forestry (A02), Manufacture of food products (C10), Manufacture of wood and products of wood (C16), Waste collection, treatment and disposal activities, materials recovery (E38)

ANNEX 4 FEATURES ONLINE BERST DASHBOARD

The software and hardware used to transfer the BERST dashboard to needs of the BIOMODEL4REGIONS project guarantees a system that can monitor and analyse indicators across regions (NUTS0, NUTS1, NUTS2) and over time.

A4.1 BERST DASHBOARD AT THE START OF BIOModel4REGIONS PROJECT

This annex showcases the main features of the dashboard by print shots taken from the BERST dashboard anno 2020 (weblink: <https://berst.databank.nl/dashboard/en-gb/dashboard/>).

The BERST dashboard has the layout of a mosaic system with themes of indicators and/or reports, e.g., ‘Biomass availability and Land use’, ‘Demographic and Workforce quality’, or ‘Regional profile reports’.

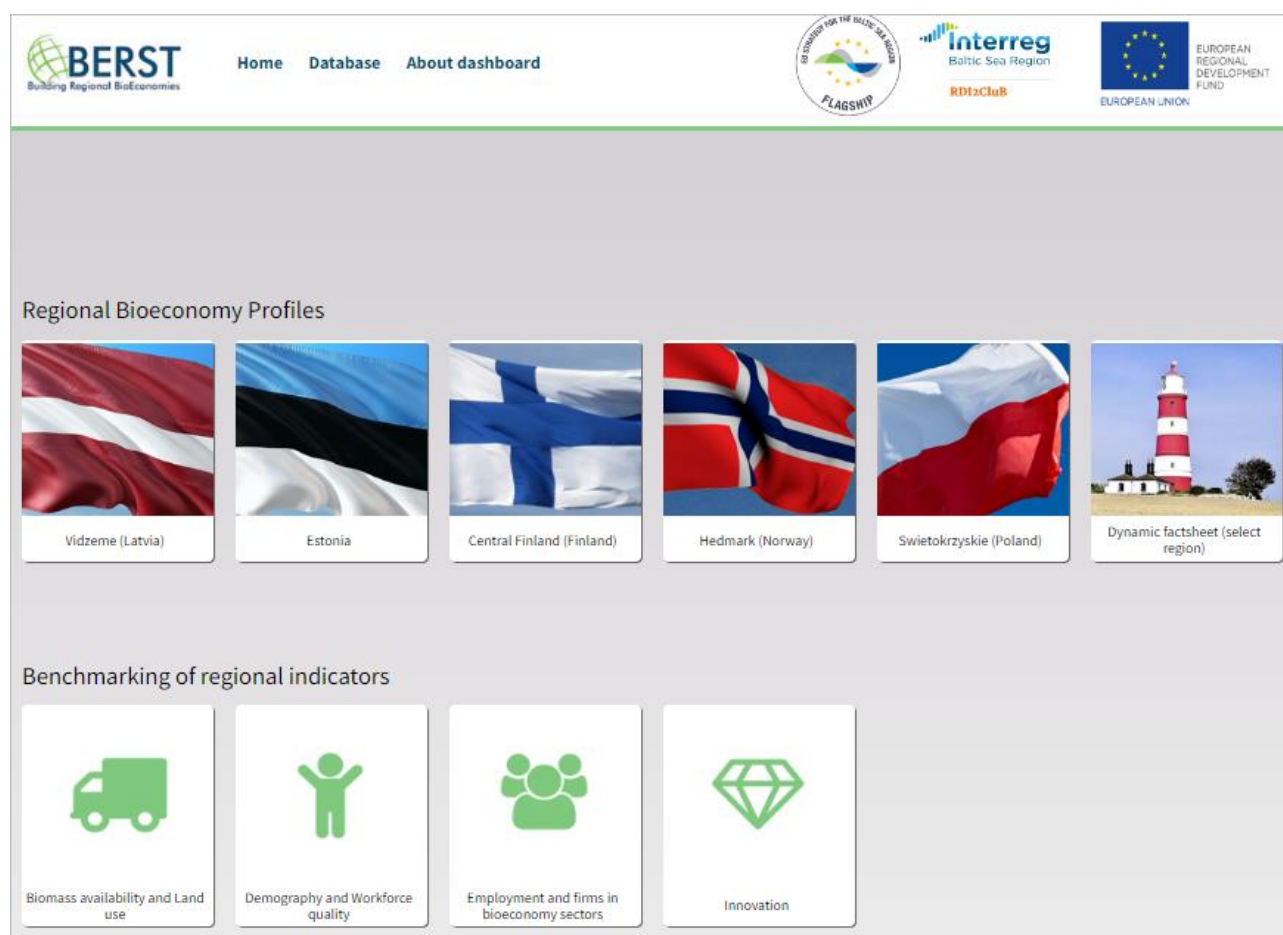


Figure A4-1 Opening screen with themes in the BERST dashboard

The BERST dashboard has graphical interfaces to visualise regional data via maps, tables, graphs, bars, spiders, and infographics (see Figure A4-1). Clicking on a theme (e.g., ‘Biomass availability and Land use’, see Figure A4-2) brings the user automatically to tiles with indicators that are connected to the selected theme.

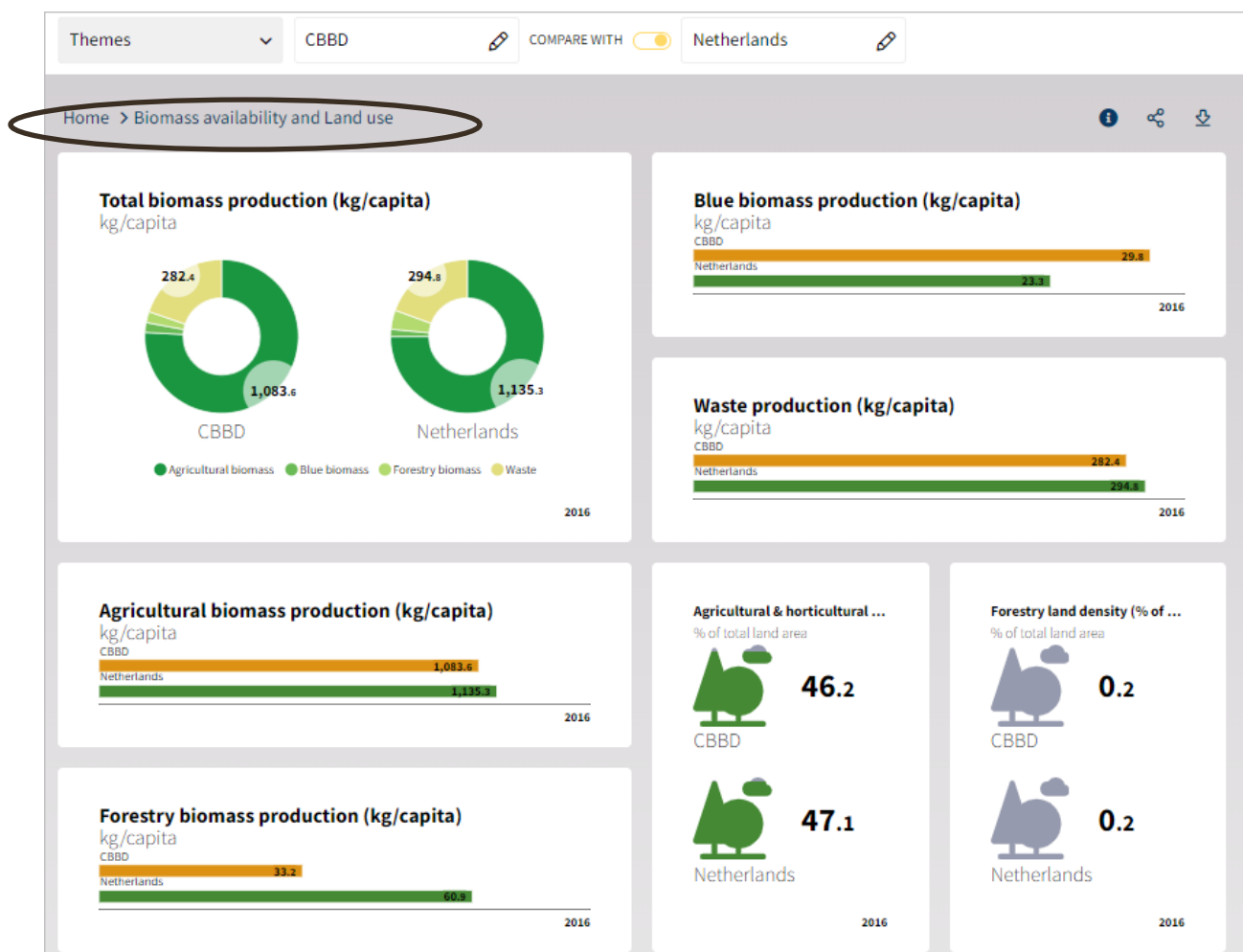


Figure A4-2 Indicators with visualisation options that below to the 'Biomass availability and Land use' theme

Further, it is possible to compare indicators of the region of interest with any other region for which data for the indicators have been collected and implemented in the dashboard. The example in Figure A4-2 shows that indicator values of 'Circular BioBased Delta region' (CBBB that consists of three NUTS2 regions Zeeland, Noord-Brabant and Zuid-Holland) are compared with indicator values of the Netherlands as a whole (Figure A4-3).



Figure A4-3 Selection of region to analyse and comparison region

By clicking on the first pencil, the user can choose another region of interest, e.g., Dytiki Makedonia (Figure A4-4). By clicking on the second pencil, the user can choose a comparison region from the same country, e.g., Peloponnisos (Figure A4-5).

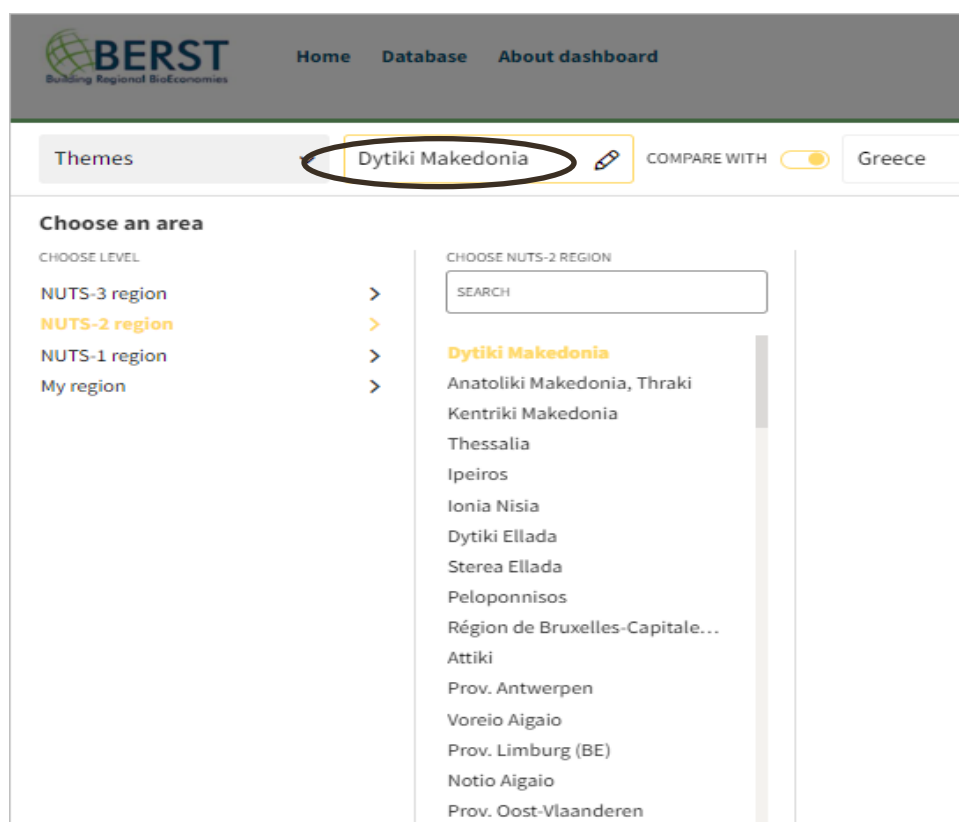


Figure A4-4 Choose a region of interest

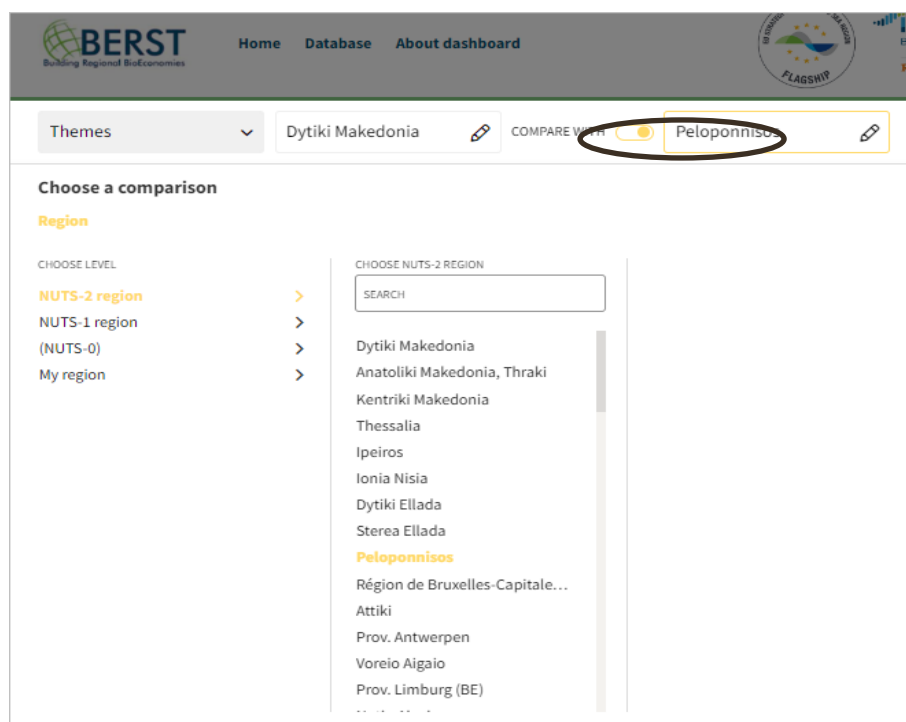


Figure A4-5 Choose a comparison region

If there is no need to compare between regions, the comparison option can be deactivated via the sliding panel (A4-6). The dashboard now shows the results for Dytiki Makedonia only..

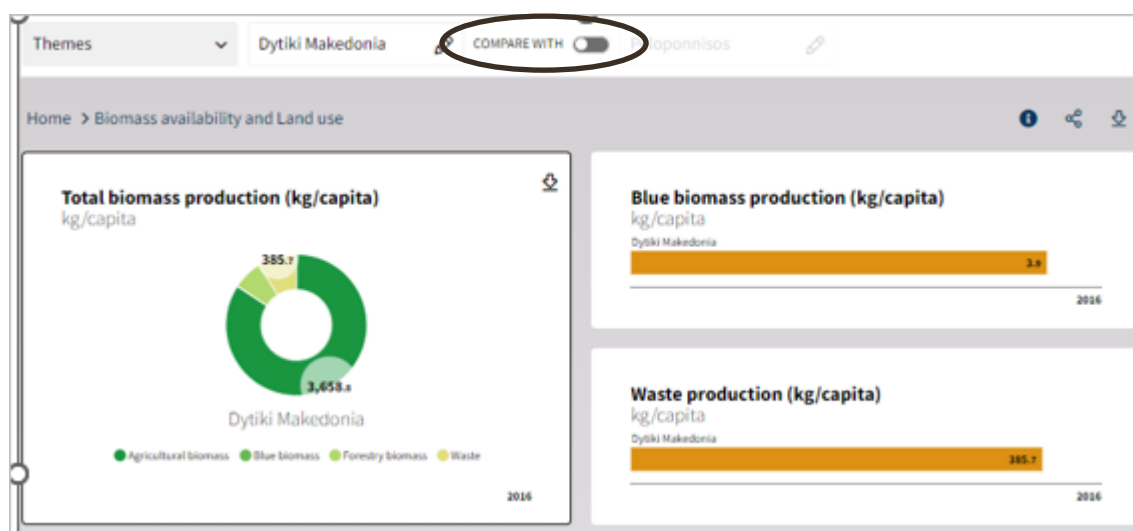


Figure A4-6 Infographics shown for a specific region (no comparison)

Produced tables, graphs, infographics and maps can be downloaded as PDF, Excel or CSV files, can be shown with additional options, and can be shared via social media or be saved as weblink (Figure A4-7).

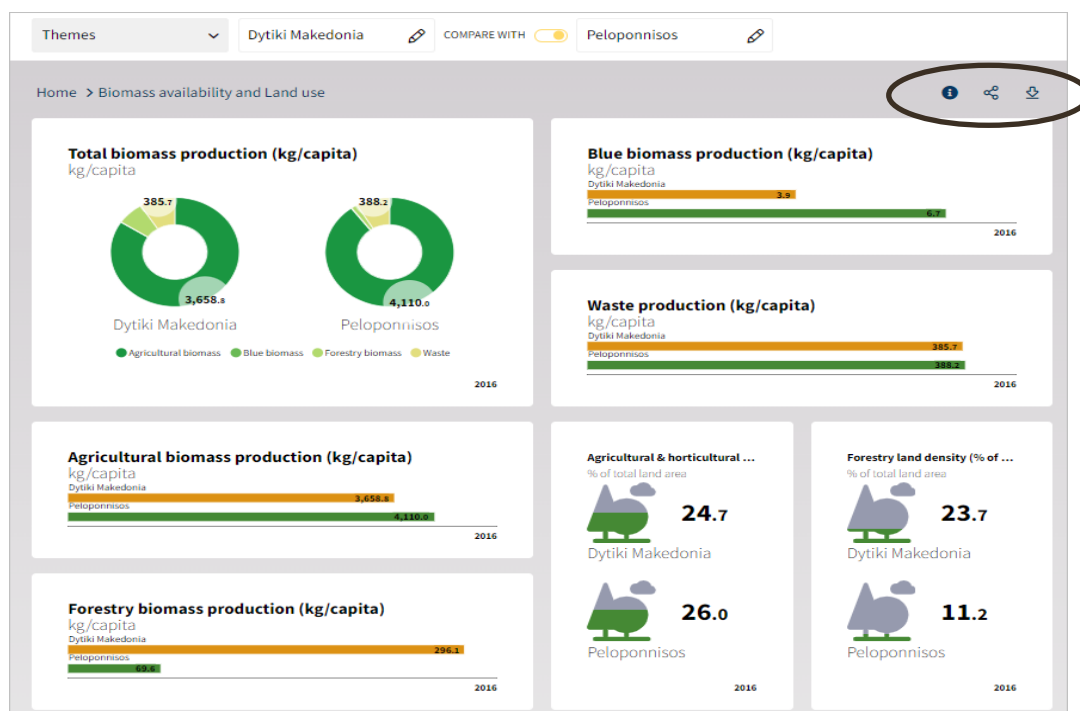


Figure A4-7 Sharing and download options

A4.2. BERST GOVERNANCE DASHBOARD CREATED IN BIOMODEL4REGIONS PROJECT

The BIOMODEL4REGIONS project aims to monitor and analyse governance indicators by applying a dashboard that supports policy recommendation. This section highlights the contours of the BERST governance dashboard (Figure A4-8). It has been set up conform the stricture of the governance framework in Figure 1. Note that only the '2. Implementation & Financing' functions are filled with data because these can be derived from e.g. Eurostat at the NUTS2 level.

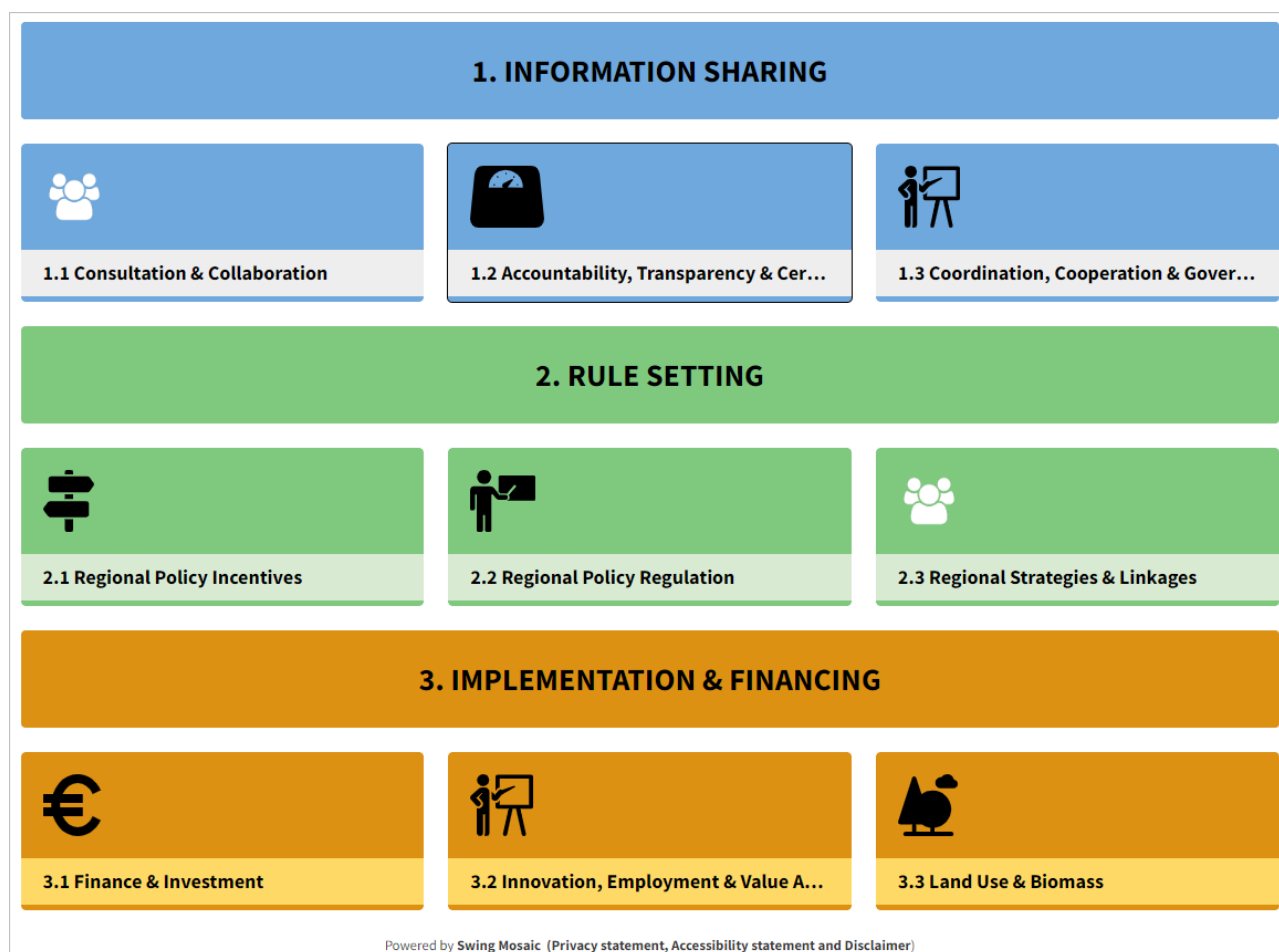
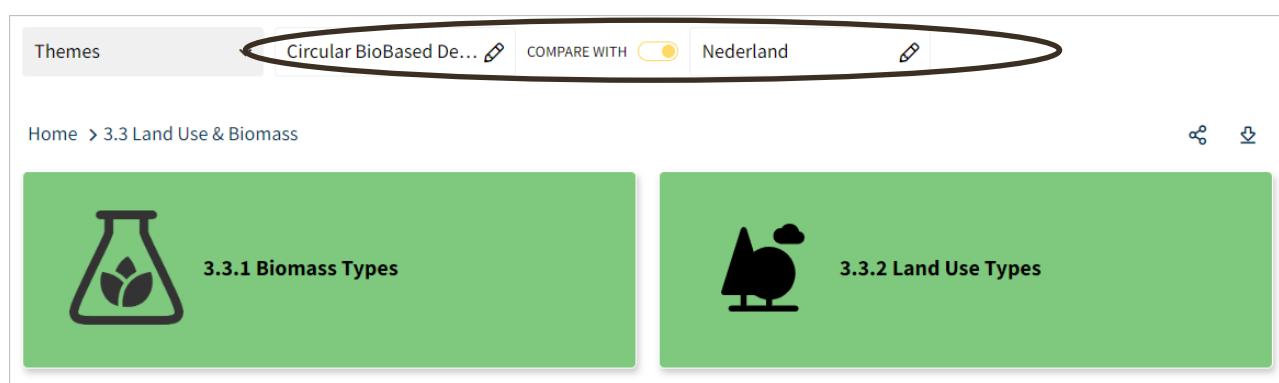


Figure A4-8 Opening screen of the BERST governance dashboard

The three broad horizontal boxes (text tiles) represent the 1st tier of the governance framework (see Figure 1), i.e., '1. INFORMATION SHARING', '2. RULE SETTING' and '3. IMPLEMENTATION & FINANCING'. Each 1st tier contains three governance areas (the 2nd tier of Figure 1). For example, '3.1 Finance & Investment', '3.2 Innovation, Employment & Value Added', and '3.3. Land Use & Biomass' belong to the 2nd tier of '3. IMPLEMENTATION & FINANCING'. By clicking on a 2nd tier tile, e.g., '3.3. Land Use & Biomass' (Figure A4-9), the user enters two tiles with sub-assessment criteria types, i.e. '3.3.1 Biomass types', and '3.3.2 Land use types' (Figure A4-10).

Figure A4-9 Tiles with sub-assessment criteria under the 2nd tier "3.3. Land Use & Biomass"

Next, by clicking on '3.3.2 Land use types' in Figure 9, the user enters the 3rd tier of the governance framework (Figure 1), which contain indicators related to 'Biomass types', and 'Land use types' respectively (Figure 10).

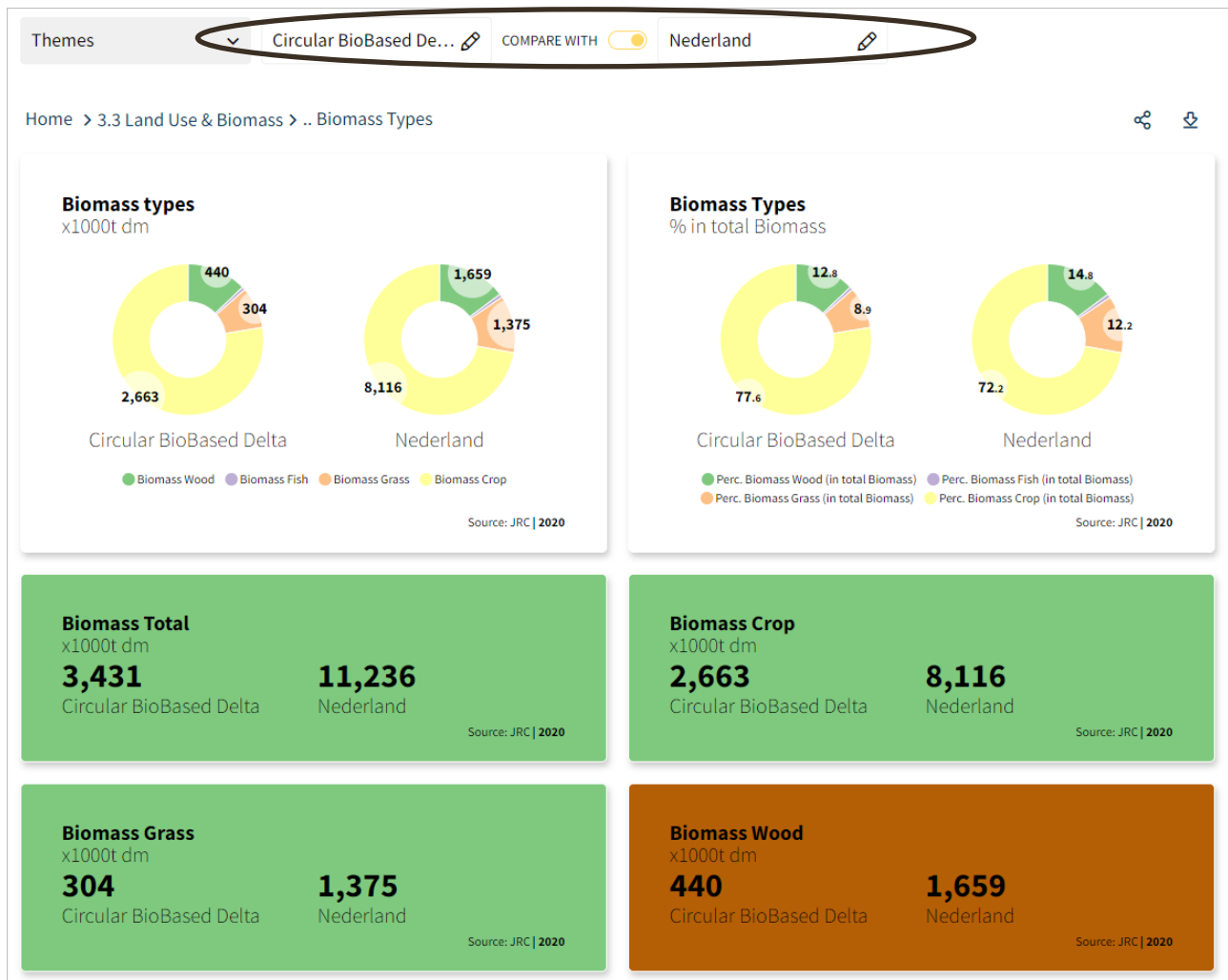


Figure A4-10 Biomass Types indicators with data for the Circular Biobased Delta region and the Netherlands

In this example the indicator values are reported for the CBBB pilot region in the BIOMODEL4REGIONS project, which are compared with values for the Netherlands. On top of the screen the user can select another region (and/or another comparison region) at NUTS0, NUTS2 or EU27 levels.