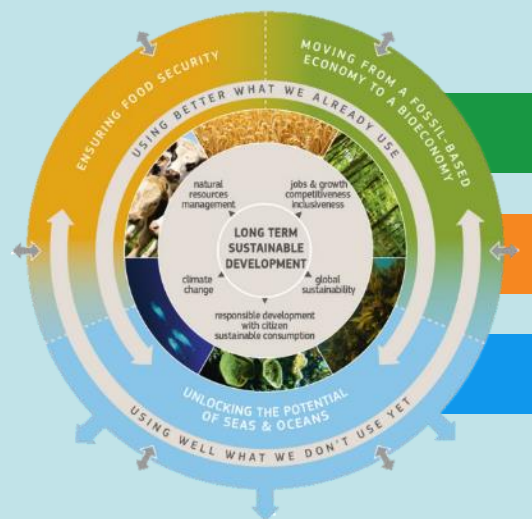


# The European Commission's science and knowledge service

Joint Research Centre



# Bioeconomy Strategy and Action Plan: Understand the ecological boundaries of the Bioeconomy



Bioeconomy Strategy

1

STRENGTHEN AND SCALE-UP THE BIO-BASED SECTORS,  
UNLOCK INVESTMENTS AND MARKETS

2

DEPLOY LOCAL BIOECONOMIES RAPIDLY ACROSS EUROPE

3

UNDERSTAND THE ECOLOGICAL BOUNDARIES OF THE BIOECONOMY



Enhance knowledge on bioeconomy



Monitor progress towards a sustainable bioeconomy



Promote good practices to operate the bioeconomy within safe ecological limits



Enhance the benefits of biodiversity in primary production

**JRC leading**



Knowledge Centre  
for Bioeconomy

# Knowledge Centre for Bioeconomy

Knowledge for policy

## Search Bioeconomy

Refine your search result using the form, left.

Search

Search options

Search results (1824)

Showing results 1 to 10

Updated Bioeconomy Strategy 2018

The 2018 update of the Bioeconomy Strategy aims to accelerate the deployment of a sustainable European bioeconomy so as to maximise its contribution towards the 2030 Agenda and its Sustainable Development Goals (SDGs), as well as the Paris...

Related organisations

- European Statistical Office of the EU (107)
- JRC - Joint Research Centre (76)
- FAO - Food and Agriculture Organization of the United Nations (58)
- OECD - Organisation for Economic Co-operation and Development (41)
- IRENA (19)
- UNSD - United Nations Statistics Division (19)
- International Energy Agency (IEA) (17)
- EBI - European Investment Bank (4)
- EP - European Parliament (3)
- EPRI (2)
- Energy research Centre of the Netherlands (1)
- Euroserver (1)

Development, and the German government, potentially affect the targets of the Sustainable Development G...

PUBLICATION | 28/02/2019

The contribution of precision agriculture technologies to farm productivity and the mitigation of greenhouse gas emissions in the EU

EU Agriculture has to cope with global challenges such as climate change mitigation or making farming more efficient. The active management of agriculture practices using appropriate technologies and practices, as Precision Agriculture...

DATASET

Solid and gaseous bioenergy pathways. Input values and GHG

## CoP on Bioeconomy

Welcome, Maria AWAHADEES

Knowledge Centre for Bioeconomy

Welcome to the Community of Practice on Bioeconomy

This Community of Practice (CoP) on Bioeconomy is an integral component of the Knowledge Centre for Bioeconomy.

Would you share your expertise on this platform? This workshop serves to pool expertise on bioeconomy, to promote the exchange of knowledge by facilitating lively discussions in order to create synergies and cooperation between the CoP members. This space is complemented by office activities that will be established when possible.

Brief on agricultural biomass production

AGRICULTURE	9.2	380	174
FORESTRY	0.5	50	24
FISHING AND AQUACULTURE	0.2	12	7
FOOD, BEVERAGES AND OTHER AGRO-MANUFACTURING	4.5	1,153	233
BIO-BASED TEXTILES	1.0	103	28
WOOD PRODUCTS AND FURNITURE	1.4	174	47

Other institutions

Brief on agricultural biomass production

Key messages

- The total annual agricultural biomass at 295 million tonnes (MT) per year... (see section 1)
- Canada accounts for more than 10% of agricultural biomass and almost the... (see section 2)
- About 70% of the EU-28 agricultural... (see section 3)
- In order to consider the actual... (see section 4)

The European Commission's Knowledge Centre for Bioeconomy

Brief on forestry biomass production

Key messages

- The total area covered by forests in the EU has been expanding at an average rate of 0.2% per year from 2000 to 2015 following... (see section 1)
- The total annual forest growth in EU forests reached 14.625 Mt in 2015. It has been increasing since 2000 at a rate of approximately 1.2% per year... (see section 2)
- Forestry accounts for 0.5% of the growth rate measured as the annual increment of EU forests - 448 Mt per year. Some findings are under-reported, the actual harvest rate is likely to be higher, but still not necessarily the growth rate... (see section 3)
- Domestic and international legislative state on forest management, and especially forest ownership, consent, species, and concentrations at EU level, with marked differences between Member States. While significant progress has been made, efforts to improve the current assessments should be pursued... (see section 4)
- Sustainable wood production implies reconciling the full range of ecosystem services which the forests provide... (see section 5)

European Commission

## A sustainable Bioeconomy for Europe: strengthening the connection between economy, society and the environment

Updated Bioeconomy Strategy

Research and Innovation

# Monitor the progress of the EU bioeconomy

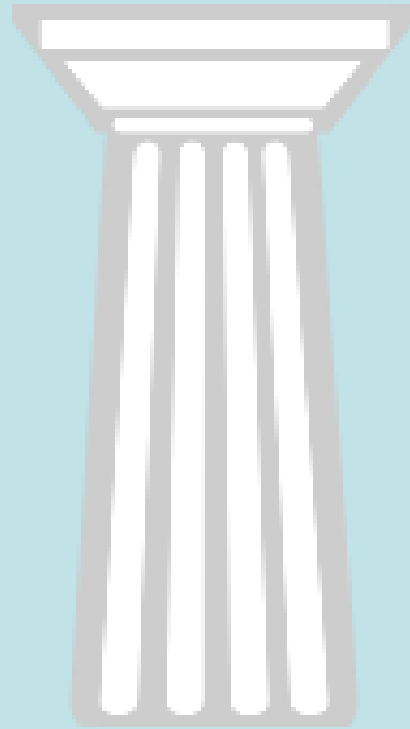
## 1) Progress towards the 5 strategy objectives



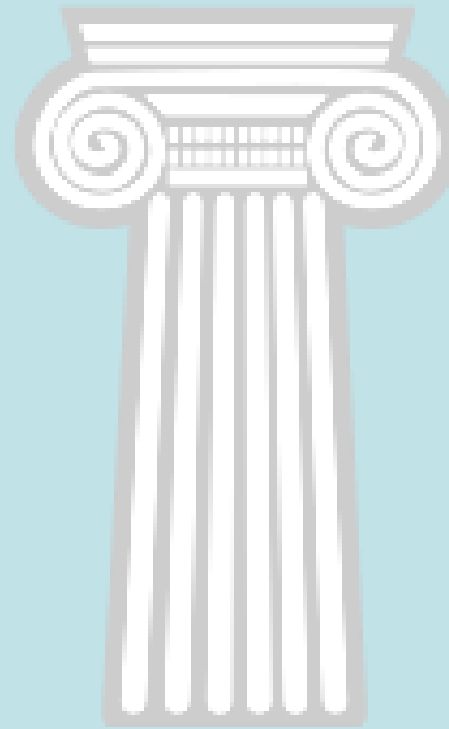
# Monitor the progress of the EU bioeconomy

## 2) Progress towards a sustainable bioeconomy

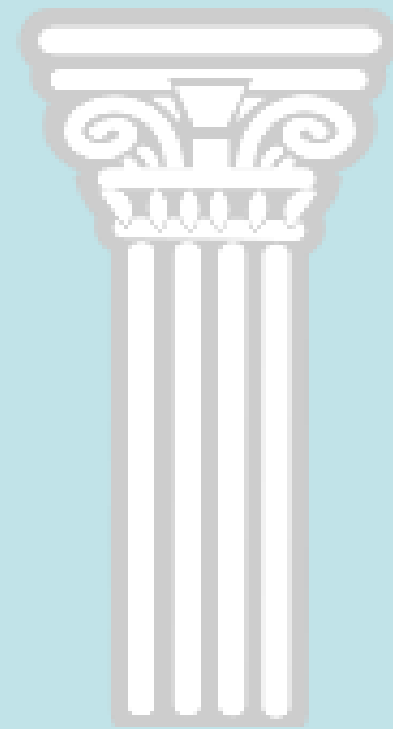
Environmental



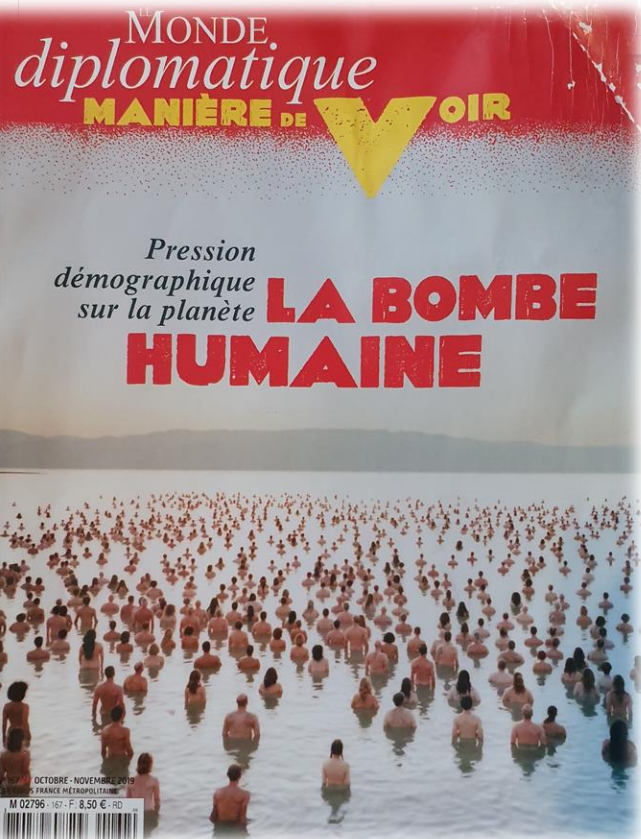
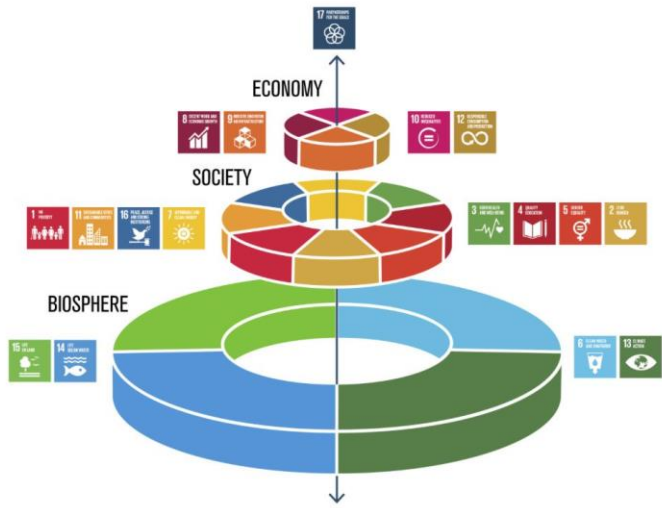
Social



Economic



# Sustainability



meeting the needs of current generation without compromising the ability of future generations to meet their own.

nature Vol 46

## FEATURE

### A safe operating space for humanity

Identifying and quantifying planetary boundaries that must not be transgressed could help prevent human activities from causing unacceptable environmental change, argue **Johan Rockström** and colleagues.

**A**lthough Earth has undergone many periods of significant environmental change, the planet's environment has been unusually stable for the past 10,000 years<sup>1-3</sup>. This period of stability — known to geologists as the Holocene — has seen human civilizations arise, develop and thrive. Such stability may now be under threat. Since the Industrial Revolution, a new era has arisen, the Anthropocene<sup>4</sup>, in which human actions have become the main driver of global environmental change<sup>5</sup>. This could see human activities push the Earth system outside the stable environmental state of the Holocene, with consequences that are detrimental or even catastrophic for large parts of the world.

During the Holocene, environmental change occurred naturally and Earth's regulatory capacity maintained the conditions that enabled human development. Regular temperatures, freshwater availability and biogeochemical flows all stayed within a relatively narrow range. Now, largely because of a rapidly growing reliance on fossil fuels and industrialized forms of agriculture, human activities have reached a level that could damage the systems that keep Earth in the desirable Holocene state. The result could be irreversible and, in some cases, abrupt environmental change, leading to a state less conducive to human development<sup>6</sup>. Without pressure from humans, the Holocene is expected to continue for at least several thousands of years<sup>7</sup>.

**Planetary boundaries**  
To meet the challenge of maintaining the Holocene state, we propose a framework based on 'planetary boundaries'. These boundaries define the safe operating space for humanity with respect to the Earth system and are associated with the planet's biophysical subsystems or processes. Although Earth's complex systems sometimes respond smoothly to changing pressures, it seems that this will prove to be the exception rather than the rule. Many subsystems of Earth react in a nonlinear, often abrupt, way, and are particularly sensitive around threshold levels of certain key variables. If these thresholds are crossed, then important subsystems, such as a monsoon system, could shift into a new state, often with deleterious or potentially even disastrous consequences for humans<sup>8,9</sup>.

Most of these thresholds can be defined by a critical value for one or more control variables, such as carbon dioxide concentration. Not all processes or subsystems on Earth have well-defined thresholds, although human actions that undermine the resilience of such processes or subsystems — for example, land and water degradation — can increase the risk that thresholds will also be crossed in other processes, such as the climate system.

We have tried to identify the Earth-system processes and associated thresholds which, if crossed, could generate unacceptable environmental change. We have found nine such processes for which we believe it is necessary to define planetary boundaries: climate change; rate of biodiversity loss (terrestrial and marine); interference with the nitrogen and phosphorus cycles; stratospheric ozone depletion; ocean acidification; global freshwater use; change in land use; chemical pollution; and atmospheric aerosol loading (see

**SUMMARY**

- New approach proposed for defining preconditions for human development
- Crossing certain biophysical thresholds could have disastrous consequences for humanity
- Three of nine interlinked planetary boundaries have already been overstepped

**ROAD TO COPENHAGEN**

# Normative criteria to describe a “sustainable bioeconomy”

## Putting order in what to measure:

- Strategy objectives
  - Normative criteria
    - Key components
      - Indicators





## ISBWG Principles

 Food security

 Inclusive growth

 Consumption

 Resource efficiency

## EU Criteria

1.1 Food nutrition and security are supported

2.3 Ecosystem services contribution to human well-being is maintained or enhanced

3.9 Demand and supply-side market mechanisms and policy coherence between supply and demand of food and non-food goods are enhanced

5.1 Resource efficiency, waste prevention and waste-re-use along the whole bioeconomy value chain is improved

5.2 Food loss and waste is minimised and, when unavoidable, its biomass is reused or recycled

## EU Key Components

**1.1.a Food availability**

**2.3.a Provisioning services**

**3.9.c Resource competition between sectors of the bioeconomy**

**5.1.c Non-food waste re-use**

**5.2.a Food loss and waste minimization**

**5.2.b Food waste re-use or recycling**





## ISBWG Principles



Natural resources

## EU Criteria

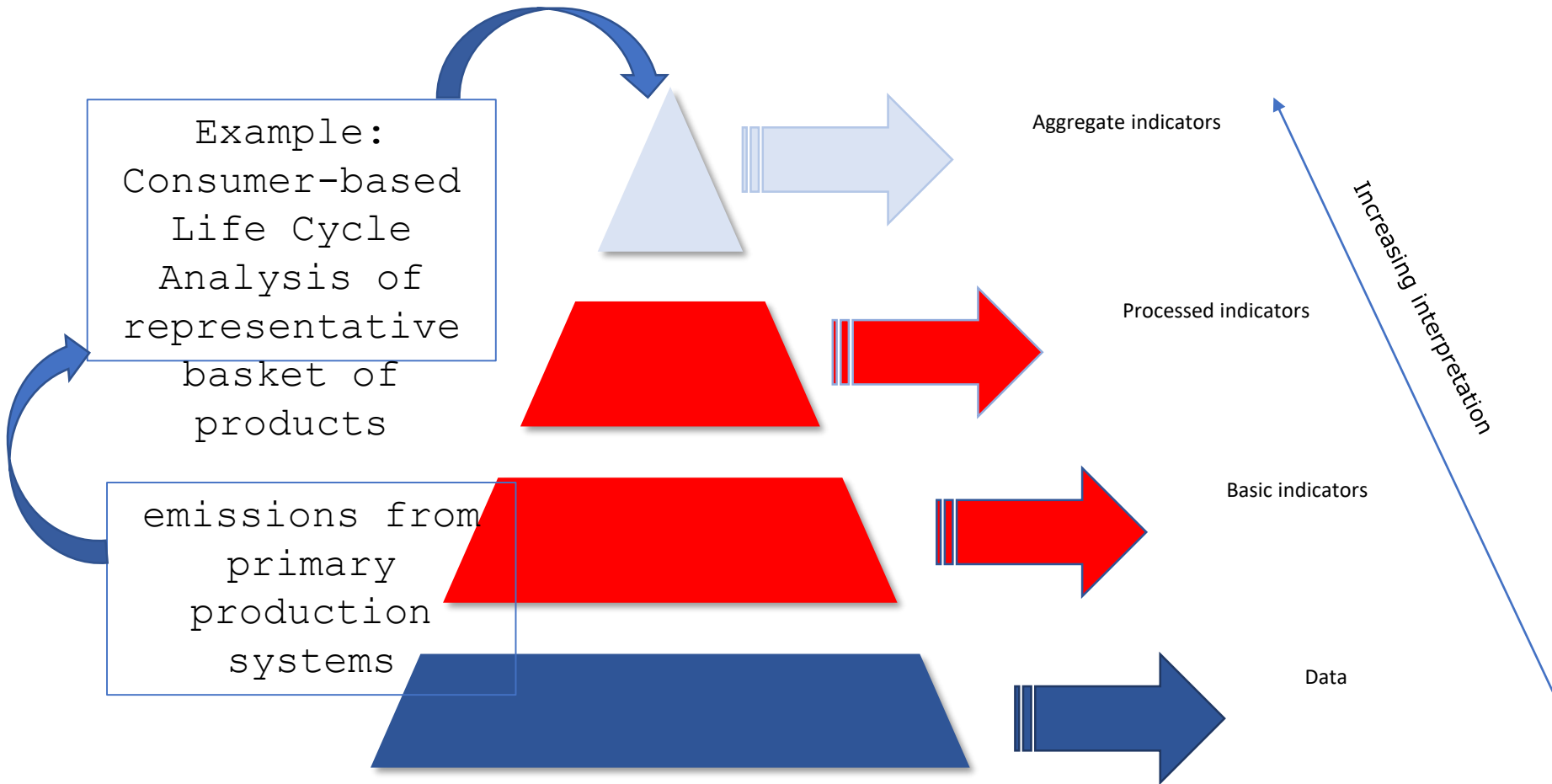
4.1 Climate change mitigation and adaptation are pursued

## EU Key Components

**4.1.a Climate change mitigation**

**4.1.b Climate change adaptation**

# Types of indicators in the Monitoring System



# Next steps

## 2020

- MS-level basic and processed indicators
- Composite indicators by objective

**\*\*WORKSHOP\*\***

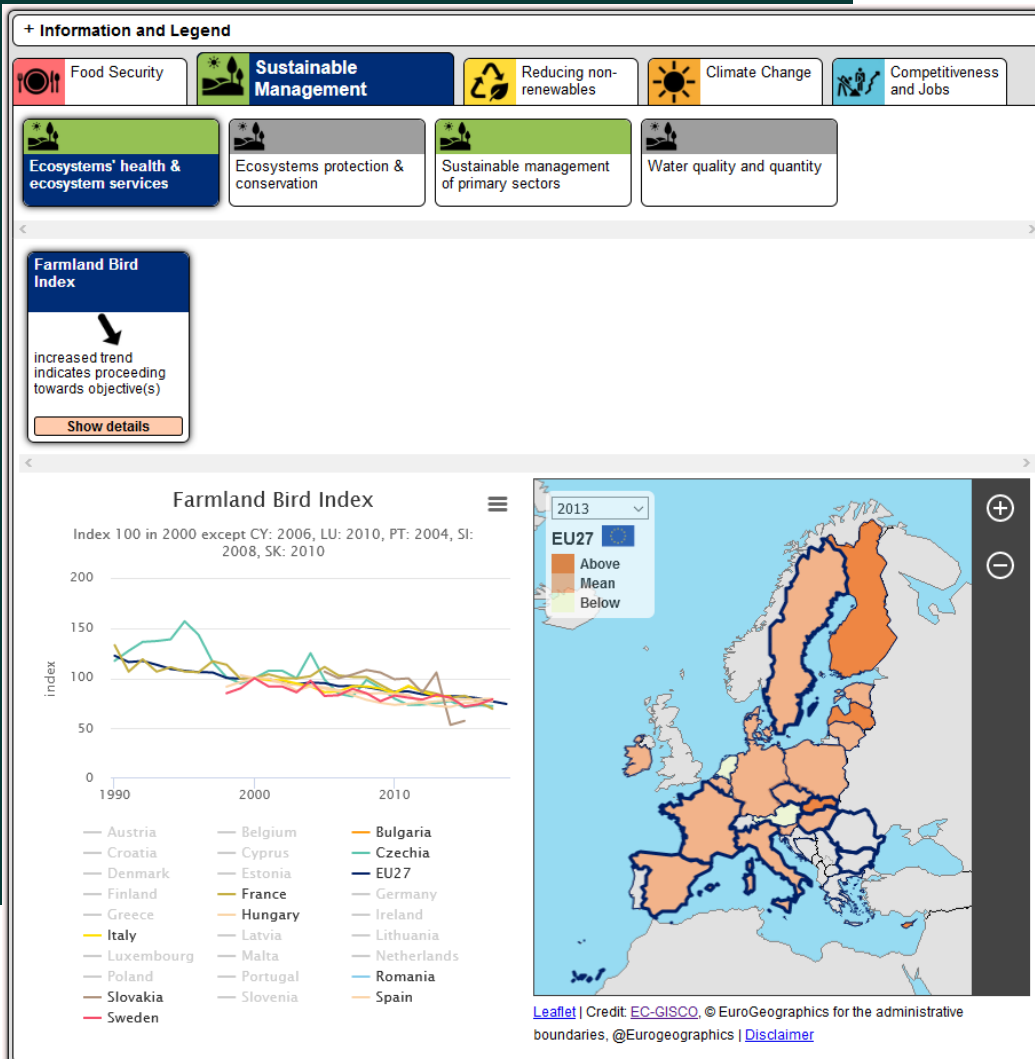
*June 17-18 2020, Ispra*

Stakeholder Workshop Indicators

## 2021

- Systems level indicators (trade-offs, shares<sup>§</sup>)
- Local level indicators including case studies

*§..of total economy, of total footprint..*



# Co-creation with ENRD

## TG Bioeconomy and Climate Action in Rural Areas

- Co-creation of EU monitoring system, especially **of local-level representation** in EU monitoring system
- **Sharing data**, indicators, case studies
- **Networking**
- Linking the EU objective to mitigate and adapt to climate change with bioeconomy (i.e. identifying the “real” impacts of bioeconomy)



# Thank you

[JRC-BIOECONOMY-MONITORING@ec.europa.eu](mailto:JRC-BIOECONOMY-MONITORING@ec.europa.eu)

[sarah.mubareka@ec.europa.eu](mailto:sarah.mubareka@ec.europa.eu)

[https://ec.europa.eu/knowledge4policy/bioeconomy\\_en](https://ec.europa.eu/knowledge4policy/bioeconomy_en)