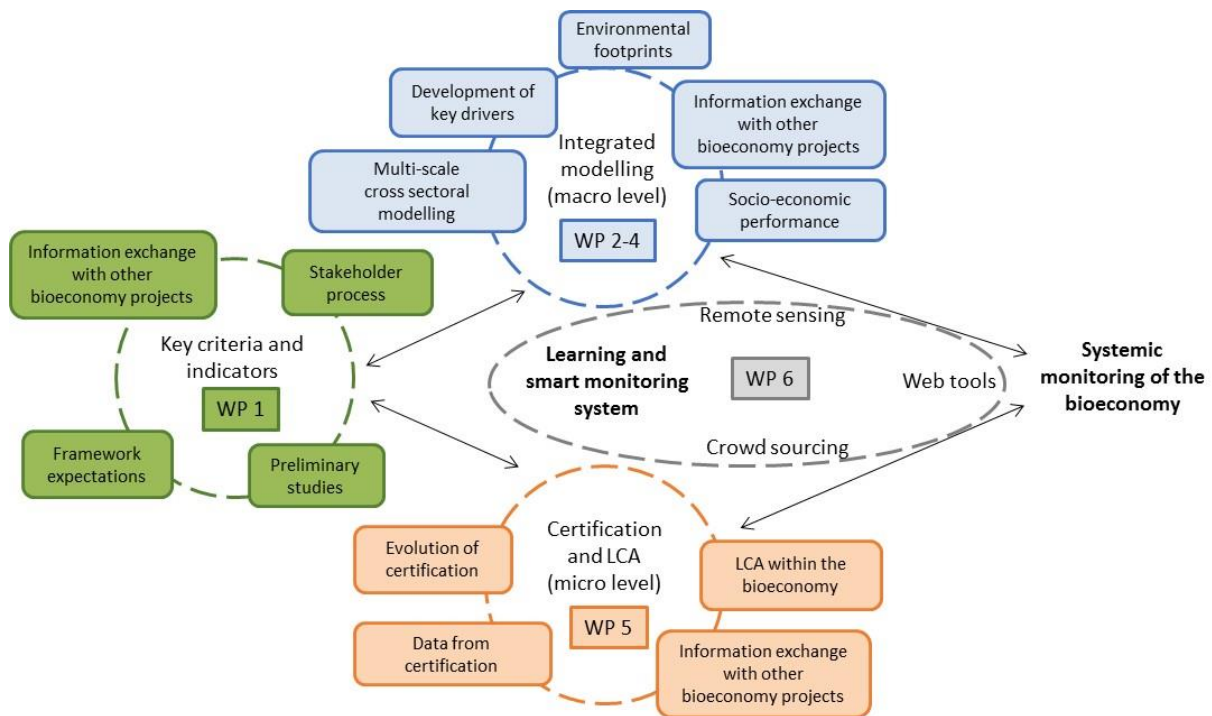


## SYMOBIO – Systemic monitoring and modelling of the bioeconomy

Symbio is a research project within the concept “Bioeconomy as Societal Change” of the German Federal Ministry of Education and Research. The funding program aims to establish the bioeconomy as an interdisciplinary and transdisciplinary research field and to introduce a perspective on the bioeconomy oriented towards societal challenges. The project develops scientific basics for a systemic monitoring and modelling of the German bioeconomy with respect to sustainability aspects on a national and international level.



Structure of the research project SYMOBIO (WP = Work package)

The project has a duration of three years, from **March 2017 until February 2020**, and is structured in **six work packages**:

**1) Definition of an appropriate framework for a systemic monitoring:** The expectations about the bioeconomy from politics, economy, non-governmental organizations and science are systemized. Important criteria and indicators for its assessment are identified.

**2) Development of a modelling and assessment system:** A multi-scale system for the analysis of the bioeconomy with regard to sustainability is developed. Material-flow models, Input-Output-databases, econometric models and land- and water use models are linked. Footprints of land, forest, water use and greenhouse gas emissions are calculated and the socio-economic balance of the bioeconomy is estimated.

**3) Analysis of the key drivers for the bioeconomy transformation:** Trend determining factors are analyzed: agricultural production systems, food consumption patterns, food waste, energetic and material use of biomass, recycling economy and cascading use as well as new technologies.

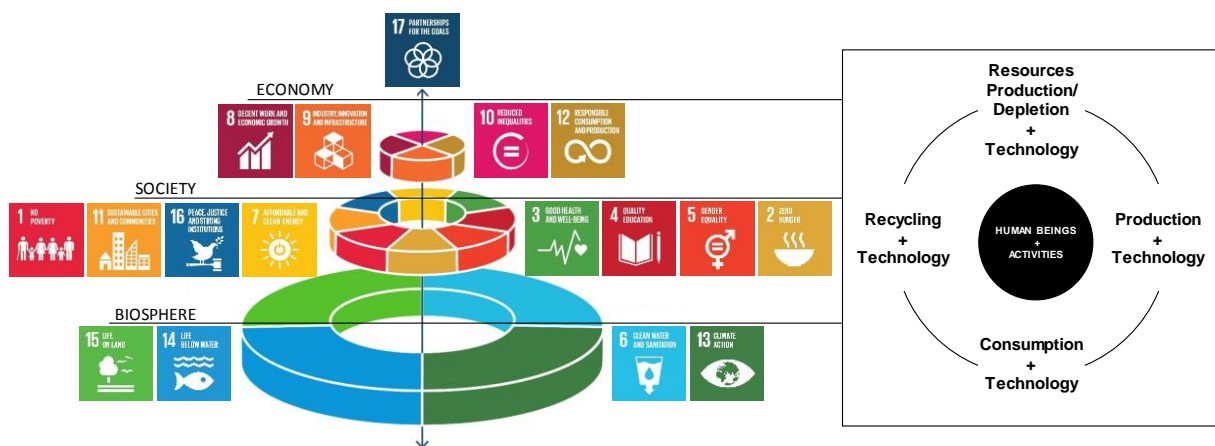
**4) Modelling of recent trends and their impact on environment and socio-economy:** Analysis of past trends and status quo. Counterfactual modelling is applied to estimate the effect of the bioeconomy. Prospective development trends and their impact are modelled as well.

**5) Indicators and data generated by certification and life cycle assessment (LCA):** The use of data and indicators generated by certification and product LCA for the monitoring of the bioeconomy are explored.

**6) Development of a monitoring system:** A pilot monitoring report for the German bioeconomy is provided. An interactive website is created where data and characteristics of the bioeconomy can be explored. Remote sensing techniques are tested nationally and internationally to show the influence of land use change on biodiversity. The results are used for monitoring and certification purposes.

The project coordination team organizes the information exchange within the project and with two other bioeconomy monitoring projects led by the [Thünen Institute](#) (funded by the Federal Ministry of Food and Agriculture) and the [ifo Institute](#) (funded by the Federal Ministry for Economic Affairs and Energy). The results of the three projects will be presented jointly at status conferences.

The development of the monitoring system goes in line with the goals of the agenda 2030 and is framed by a bioeconomy systems analysis approach.



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The following **partners** are involved in the SYMOBIO project:



The [Center for Environmental Systems Research \(CESR\)](#) of Kassel University coordinates the project.

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