UNIVERSITY OF HOHENHEIM

## MASTER'S PROGRAM IN

# BIOECONOMY

Speakers: Prof. Lewandowski & Svenja Schuhmacher

# AGENDA

1. What is bioeconomy?
2. Bioeconomy at the University of Hohenheim
3. Master‘s Program in Bioeconomy

# WHAT IS BIOECONOMY?

The bioeconomy is the production, utilization, conservation, and regeneration of biological resources, including related knowledge, science, technology, and innovation, to provide sustainable solutions (information, products, processes and services) within and across all economic sectors and enable a transformation to a sustainable economy. The bioeconomy is not a static notion and its meaning is continually evolving.

Global Bioeconomy Summit 2024 Communiqué


Lewandowski et al. (2025)

# WHAT IS BIOECONOMY?

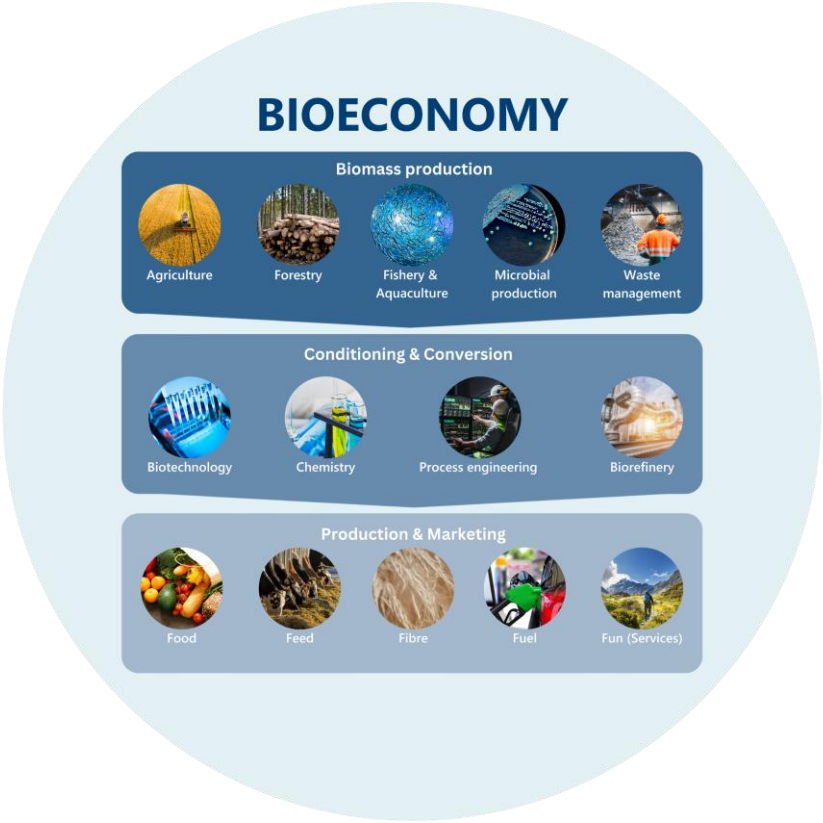
Main proposition:
We have to provide mankind with food and consumables, so let's do it in the best way possible!

### Biobased Resources

- Plants
- Animals
- Micro-organisms
- Organic residuals

### Principles

- Sustainability
- Multi-functionality
- Life-cycle thinking
- Circularity & Cascading Use
- Holistic and systems approachs
- Integrated value webs




### Biological Knowledge

- Biotechnology
- Biorefineries
- Ecosystem Services
- Nature-based solutions

Innovations: technological and social

### Aim: Practical solutions to societal challenges

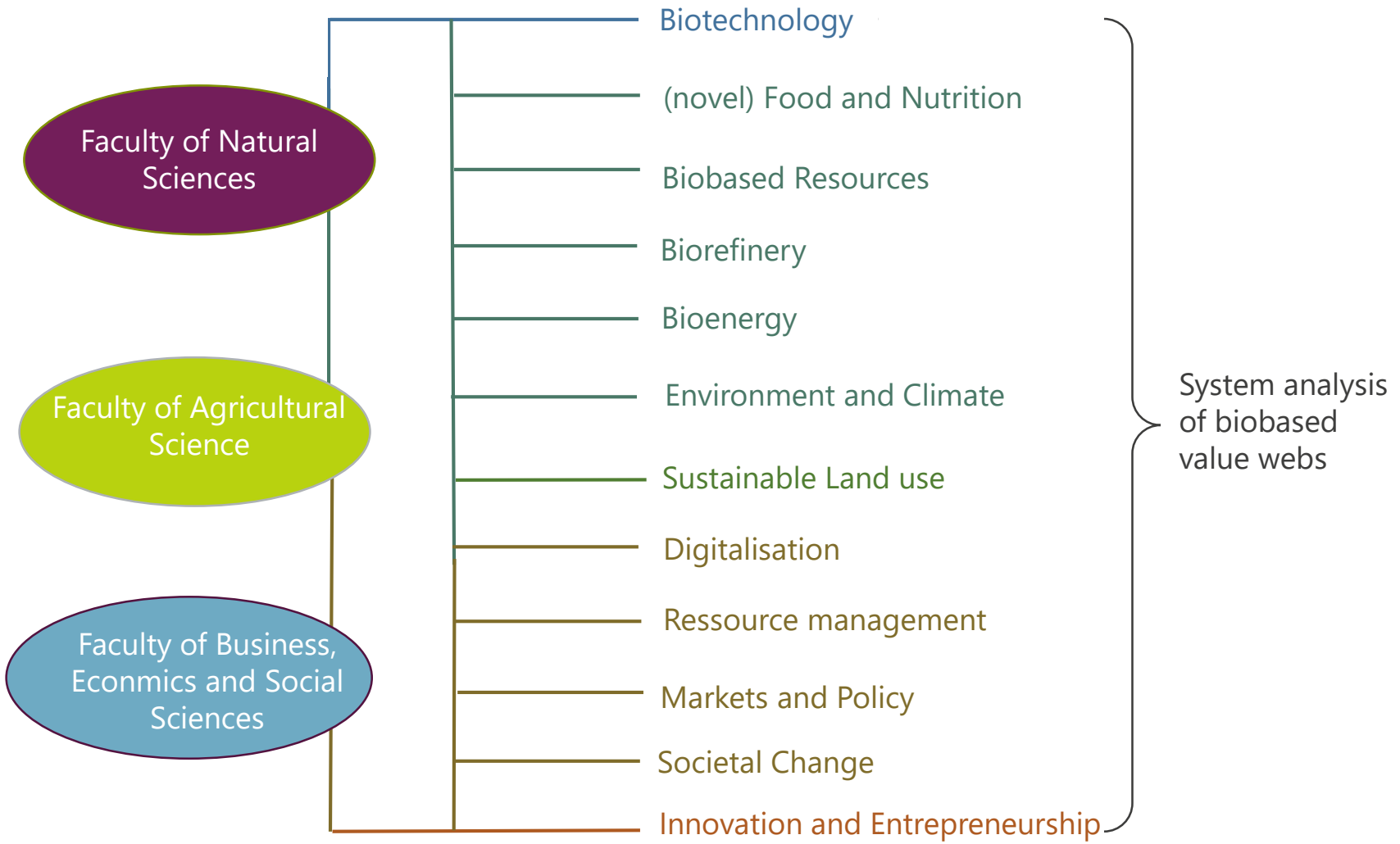
- Climate Change mitigation
- Food security
- Sustainability transformation
- Renewable energie

Sustainable use of natural resources

= An operational approach for a sustainable economy

Lewandowski et al. (2025)

# BIOECONOMY AT THE UNIVERSITY OF HOHENHEIM



# BIOECONOMY AT THE UNIVERSITY OF HOHENHEIM

## Hohenheim Research Centers

Bioeconomy

Global Food Security and Ecosystems

Health Sciences

Chief Bioeconomy Officer (CBO) Iris Lewandowski

Bioeconomy Lab

## Agricultural Research Stations
## Biorefinery and Food Technology Centers

Research and Educational Laboratories

## Study Programs

Biobased Products and Bioenergy **Bioeconomy** Earth and Climate System Science

Agricultural Sciences, Biotechnology, Food Science and Technology, Food Systems


Public Relation


Consulting

Baden-Württemberg
German Government


International



International Advisory Council on Global Bioeconomy

Circular Bio-based Europe
Joint Undertaking

Resource Production

Properties

Conversion

Biobased Products

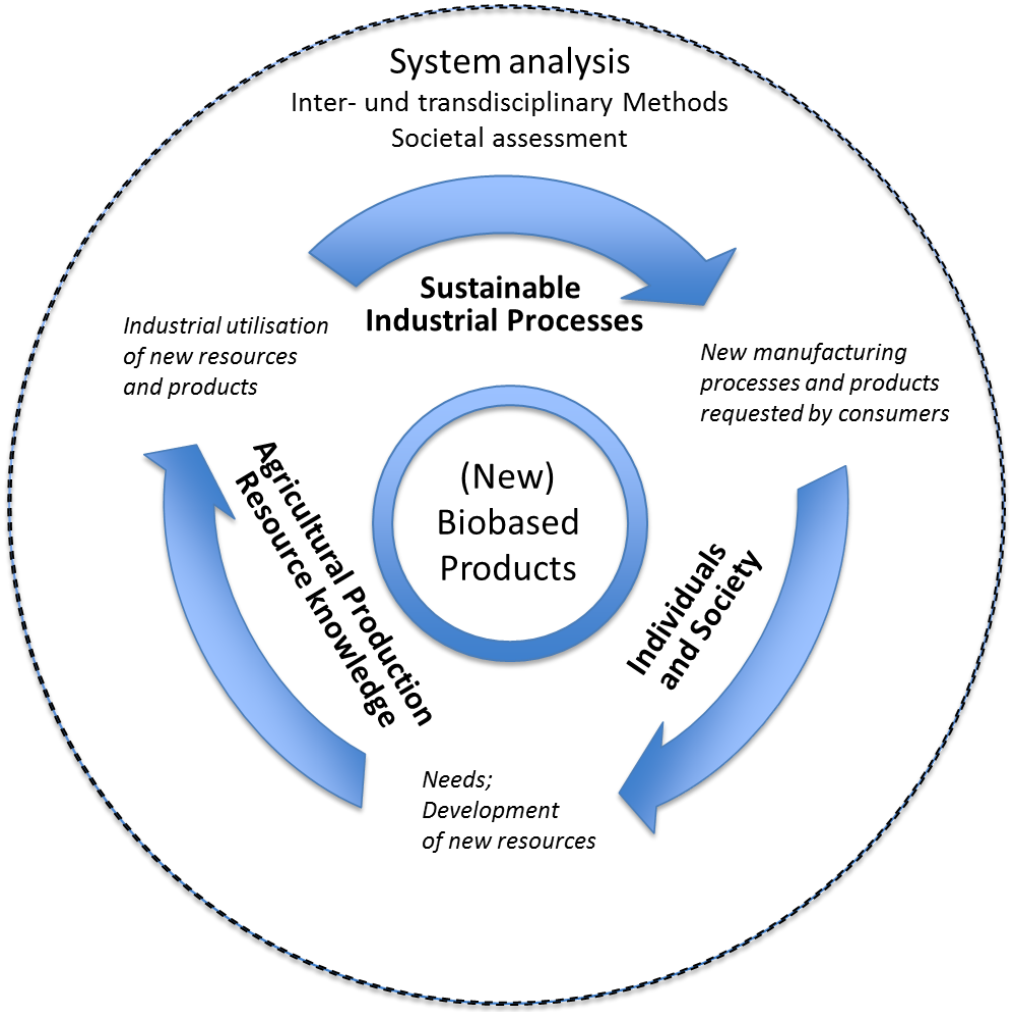
Market introduction

**Inter- and transdisciplinary analysis and assessment of biobased value chains and webs**

## ...from each of the following perspectives:

- Companies that focus on new biobased resources, processes and products;
- Established producers seeking to introduce renewable resources, biotechnological processes and their corresponding products onto the market;
- Actors attempting to gauge the need and acceptance of such products;
- Organizations that support the development of biobased value chains, e. g. through research and advisory services.

# MASTER'S PROGRAM IN BIOECONOMY



# QUALIFICATION PROFILE

## T- Profile

Systematic, integrative and participative approaches

Disciplinary expertise

# CURRICULUM

Compulsory modules

Bridge modules

Elective modules

| 1st semester | 2nd semester | 3rd semester | 4th semester |
|---|---|---|---|
| Inter- and Transdisciplinary Research Approaches | Sustainable Industrial Processes | Elective Modules | Master's thesis |
| Properties of Biobased Resources and Products | Farm Economics & Value Chain Development | | |
| Agricultural Production of Biobased Resources | Economic Policy Analysis of the Bioeconomy | | |
| Fundamentals of Economics | Financial Management | | |
| Natural Science Concepts | Projects in Bioeconomic Research | | |
| Life-cycle Sustainability Assessment | | EBU label | |

# CURRICULUM

| | 1st semester | 2nd semester | 3rd semester | 4th semester |
|---|---|---|---|---|
| Compulsory modules | Inter- and Transdisciplinary Research Approaches | Sustainable Industrial Processes | **Profiles:**<br>• Bioeconomy policy analysis<br>• Sustainable biomass production systems<br>• Biomass processing and biorefinery<br>• Sustainability assessment in the bioeconomy<br>• Innovation and entrepreneurship in the bioeconomy<br>• Transforming food systems within the bioeconomy<br>• Data Science and artificial intelligence in the bioeconomy | |
| | Properties of Biobased Resources and Products | Farm Economics & Value Chain Development | | |
| Bridge modules | Agricultural Production of Biobased Resources | Economic Policy Analysis of the Bioeconomy | | |
| | Fundamentals of Economics | Financial Management | | |
| Elective modules | Natural Science Concepts | Projects in Bioeconomic Research | | |

# PROFILE 1 - BIOECONOMY POLICY ANALYSIS

**Objective of this profile: Graduates …**

- can apply bioeconomic knowledge to develop models for the analysis of policies.
- understand the policy cycle and the concept of policy windows.
- are able to use GAMS for policy analysis.

**Possible career fields …**

- Consulting on the development of policy strategies, e.g. in ministries, at EU or international institutions
- Research, e.g. in international institutions or at Universities with policy or systems sciences, such as agricultural or environmental sciences

# PROFILE 2 – SUSTAINABLE BIOMASS PRODUCTION SYSTEMS

**Objective of this profile: Graduates …**

- have gained an overview of sustainable agricultural production principles.
- understand how agricultural production will (or should) develop to address future challenges and biomass demand.
- have acquired solid methodical competences (in statistics or modelling or …) to be applied in their master's thesis.

**Possible career fields …**

- Project management: for companies from the biobased sectors, (international) organisations or Bioeconomy research
- Sustainability consulting and management: in sustainability or strategy as well as supply and trade and international sales departments of companies, at policy level, in (international) organisations or on Sustainability financing, e.g. in banks
- Research at Universities, national or international research institutes or in R&D of companies

# PROFILE 3 – BIOMASS PROCESSING AND BIOREFINERY

## Objective of this profile: Graduates …

- understand the principles and concepts related to thermo- and bio-chemical conversion processes for biomass biorefining
- apply systems thinking and practice for the analysis, design and development of biomass processing pathways and biorefinery systems
- obtain technical skills for setting upstream, midstream and downstream processes for the production of non-food biobased products

## Possible career fields …

- Technology scouting consulting on the development of biomass conversion and biorefinery technologies
- Research at universities, national or international research institutes or in R&D of companies developing biobased value chains and their technologies
- Consulting on the suitability of biomass processing pathways for biobased value chains

# PROFILE 4 – SUSTAINABILITY ASSESSMENT IN THE BIOECONOMY

**Objective of this profile: Graduates …**

- have a detailed understanding of the concept of sustainability and sustainable development
- are able to assess environmental and economic sustainability quantitatively; and also social risk qualitatively
- have solid methodological competences in the modelling and assessment of biomass-based product systems

**Possible career fields …**

- Sustainability consulting: as independent consultant and project developer, in sustainability or strategy as well as supply and trade and international sales departments of companies, at policy level, in (international) organizations or on Sustainability financing, e.g. in banks
- Sustainability, Energy and environmental management
- Research at Universities, national or international research institutes or in R&D of companies

# PROFILE 5 – INNOVATION AND ENTREPRENEURSHIP IN THE BIOECONOMY

**Objective of this profile: Graduates…**

- understand the potential for innovation and entrepreneurship in the bioeconomic sector.
- understand the key principles of interdisciplinary collaboration and project management in the bioeconomy.
- are able to integrate their previous educational background and profile knowledge to launch or join a start-up.

**Possible career fields**

- Entrepreneur: starting an own company
- Technology scouting
- Innovation management
- Marketing strategy

# PROFILE 6 – TRANSFORMING FOOD SYSTEMS WITHIN THE BIOECONOMY

## Objective of this profile: Graduates …

- understand food systems from an interdisciplinary point of view and in relation to the bioeconomy
- are familiar with upgrading opportunities for food value chains and webs based on by-product utilization, sustainability performance, resource efficiency and circularity
- can apply interdisciplinary knowledge to the design of food processing systems and the development of innovative and sustainable food products from dedicated crops (established and novel crops) and residual biomass

## Possible career fields …

- Marketing strategy development for sustainable food products and systems
- Technology scouting in food systems and for the development of novel and sustainable food products
- Research on the development of novel and sustainable food products and systems, e.g. in R&D departments of companies, universities or research institutions

# PROFILE 7 – DATA SCIENCE AND ARTIFICIAL INTELLIGENCE IN THE BIOECONOMY

(AIDAHO Certificate optional)

**Objective of this profile: Graduates…**

- understand the necessity of integrating data analytics for the future applications of the Bioeconomy
- learn state-of-the-art procedures and methods for data science, machine learning, and artificial intelligence
- apply the learned methods for data analytics in the field of Bioeconomy

**Possible career fields …**

- All fields of Bioeconomy in which data needs to be analysed, e.g.,
- (product) development
- strategic management
- consulting, or
- research

# TEXTBOOK




Open Access

Bioeconomy

Shaping the Transition to a Sustainable, Biobased Economy

Herausgeber: **Lewandowski**, Iris (Ed.)

→ 2nd Edition with virtual didactic elements in 2025

**More information:**

**www.uni-hohenheim.de/bioeconomy**

# “HOHENHEIM BIOECONOMISTS” ARE ABLE TO:

- **Apply a value chain perspective**
  - plan, assess and analyse production and processing of renewable resources across all sectors
  - coordinate production of biobased products in a locally-adapted way
- **Determine and use appropriate technologies and processes**
  - understand key technologies and advance their economic use
  - consider interdependencies of biomass utilisation pathways
- **Consider ecological, societal and economical requirements**
  - consider growing societal requirements for biobased products and production methods
  - organize the market launch of new biobased products
  - understand the embeddedness of (new) biobased products in value chains from micro- and macroeconomic perspectives
  - consult on sustainable solutions balancing ecological, societal and economic requirements
- **Set up general conditions and institutional frameworks**
  - coordinate cooperation of different stakeholders in the development of biobased value chains
  - promote the establishment of adequate institutional and policy frameworks, e.g. standards for sustainability in resource production

# CAREER PROSPECTS

- **Private sector**
  - Companies that produce products based on
    - Biological resources and
    - Biotechnical processes

    e. g. food, biobased consumer products and bioenergy
  - Professional positions in production, marketing, sustainability and innovation management and R&D
  - Project management positions
- **Start-ups**
  - Entrepreneur: starting an own company
- **Research and Development**
  - Public sector research organisations, including Universities, at national and international level in the field of the bioeconomy
  - Organisations that support biobased value chains (including consulting companies and financial organisations)
- **Public Sector**
  - Ministries and agencies that support the bioeconomy
  - International organisations that support the bioeconomy (including international development organisations)

# APPLICATION AND ADMISSION

- **Application deadline:** June 15
- **Number of places:** unlimited
- **Open for students with a degree in either:**
  - Natural Sciences or Engineering
  - Agricultural, Horticultural or Forestry Science
  - Social, Economic or Business Sciences

# APPLICATION AND ADMISSION

- **Admission requirements:**
  - A degree (minimum 3 years of study) from a German or foreign university or an equivalent academic qualification
  - English skills (e.g. internet-based TOEFL 90 points, further test formats possible)

- **Selection criteria:** A seat is guaranteed to all those who meet the entry requirements!

# FIVE REASONS TO STUDY BIOECONOMY AT HOHENHEIM

1. Unique and innovative study program that
2. addresses the fundamental challenges of the 21st century
3. Has an international perspective on bioeconomy
4. T-shaped qualification profile

   → Combining specialist knowledge with the abilities to collaborate across disciplines and sectors and to shape the transformation to a sustainable economy
5. Manifold career prospects in all bioeconomy-related fields


**Further information:**
**www.uni-hohenheim.de/en/bioeconomy-masters**

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