



# BIOECONOMY IN GENERAL

The bioeconomy aims to address environmental, economic, and social challenges by promoting the sustainable use of biological resources, reducing greenhouse gas emissions, and creating new economic opportunities. It emphasizes the integration of biological knowledge, technological innovation, and responsible resource management to build a more resilient and eco-friendly economy.



## WHAT ARE THE GENERAL CHALLENGES THE BIOECONOMY CONCEPT IS GOING TO ADDRESS

### 1 SUSTAINABLE RESOURCES USAGE

2 ENVIRONMENT - water use, soil degradation, biodiversity loss

3 LAND USE - deforestation, palm oil etc.

4 ECONOMY - competing with non-bio based alternatives

5 MARKET DEVELOPMENT AND CONSUMERS - bio-based alternatives may be less familiar or more expensive than traditional alternatives.

6 GLOBALIZATION AND TRADE - intellectual property rights, and access to genetic resources can pose challenges

7 CLIMATE CHANGE - affecting the availability and quality of biomass resources

8 TECHNOLOGICAL INNOVATION AND INFRASTRUCTURE - infrastructure for the bioeconomy can be a costly and time-consuming process.

9 SOCIAL ACCEPTANCE - social acceptance and addressing ethical concerns are vital for the success of the bioeconomy.

10 POLICY AND REGULATORY FRAMEWORKS - Coordination among different sectors and stakeholders is essential.





## DEFINITION

According to the United Nations Food and Agriculture Organisation, the bioeconomy is „the production, use and conservation of biological resources, including related knowledge, science, technology, and innovation to provide information, products, processes and services to all economic sectors with the aim of moving towards a sustainable economy“.



## SPECIFIC PROBLEMS FOR THAT WE ARE GOING USE BIOECONOMY CONCEPT

USE OF  
SUSTAINABLE  
ENERGY

CLIMATE  
CHANGE

TECHNOLOGICAL  
INNOVATION

ECONOMIC  
DEVELOPMENT

ENVIRONMENTAL  
IMPACT



## WHAT ARE THE MAIN TOOLS OFFERED BY BIOECONOMY

### BIOTECHNOLOGY:

Biotechnology is the basis for numerous processes for the production of bio-based products such as food and feed, pharmaceuticals, chemical products and energy sources. It plays a central role also by providing tools for manipulating biological systems at the molecular and cellular levels. This includes genetic engineering, synthetic biology, and metabolic engineering, which allow for the modification of organisms to enhance their productivity and create new bio-based products.

### ADVANCED AGRICULTURE PRACTICES:

Precision agriculture, agroecology, and other advanced farming practices contribute to sustainable and efficient crop production. These approaches optimize resource use, reduce environmental impact, and enhance the resilience of agricultural systems.

### BIOMASS CONVERSION TECHNOLOGIES:

Various technologies are employed to convert biomass into valuable products. Examples include:

**Biochemical Conversion:** Enzymes and microorganisms are used to convert biomass into biofuels, chemicals, and other products.

**Thermochemical Conversion:** Heat and chemicals are used to convert biomass into bioenergy, biofuels, and bio-based chemicals.

### BIO-BASED MATERIALS AND PRODUCTS:

The bioeconomy produces a range of bio-based materials, including bio-plastics, bio-textiles, and bio-composites, as alternatives to traditional, fossil-based materials. These materials contribute to the development of a more sustainable and circular economy.

### RENEWABLE ENERGY TECHNOLOGIES:

Technologies for the production of bioenergy resources, such as biofuels and biogas, are critical components of the bioeconomy. This includes processes like anaerobic digestion, fermentation, and thermochemical conversion to produce energy from organic materials.

### BIOREFINERIES:

Biorefineries are facilities that integrate various biomass conversion processes to produce a range of bio-based products and bioenergy. They play a key role in maximizing the value obtained from biomass resources.

### SUSTAINABLE FORESTRY PRACTICES:

Sustainable forestry practices contribute to the responsible management of forest resources, ensuring that biomass is harvested in an environmentally and socially sustainable manner. This includes practices like selective logging and reforestation.

### CIRCULAR ECONOMY PRINCIPLES:

The bioeconomy aligns with circular economy principles, emphasizing the reduction, reuse, and recycling of materials. This helps minimize waste and ensures a more sustainable and resource-efficient economic model.

### DIGITAL TECHNOLOGIES:

Digital technologies, including precision farming tools, sensors, and data analytics, enhance the efficiency and productivity of bioeconomy activities. These technologies contribute to smart and data-driven approaches in agriculture and bio-based production.

### POLICY AND REGULATORY INSTRUMENTS:

Effective policies and regulatory frameworks are essential tools for guiding the development of the bioeconomy. These instruments can provide incentives for sustainable practices, address ethical concerns, and create a supportive environment for bioeconomy activities.



## BACKGROUND OF BIOECONOMY (WHY THIS CONCEPT HAS BEEN DEVELOPED - E.G FAILURE OF MAINSTREAM ECONOMIC THINKING)

The concept of the bioeconomy has emerged in response to various challenges and drawbacks associated with conventional economic models. While not explicitly framed as a rejection of mainstream economic thinking, the development of the bioeconomy reflects a growing recognition of the limitations and environmental consequences of traditional economic systems



## WHICH FACTORS CONTRIBUTE TO THE BACKGROUND OF THE BIOECONOMY?

### FINITE FOSSIL RESOURCES:

Traditional economic models heavily rely on finite fossil resources like coal, oil, and natural gas. Concerns about depletion and environmental impact, particularly climate change, drive the need for alternative, renewable resources.

### ENVIRONMENTAL DEGRADATION AND CLIMATE CHANGE:

Mainstream economic activities are often linked to environmental degradation, deforestation, and greenhouse gas emissions. The bioeconomy concept responds to the demand for more sustainable and environmentally friendly economic practices to address climate change and protect ecosystems.

### DEPENDENCY ON NON-RENEWABLE RESOURCES:

The bioeconomy aims to reduce reliance on non-renewable resources and shift towards a model based on renewable biological resources. This shift addresses concerns about the long-term sustainability of using finite resources for economic development.

### CIRCULAR ECONOMY PRINCIPLES:

The bioeconomy aligns with the principles of a circular economy, emphasizing the importance of reducing waste, reusing materials, and recycling resources. This stands in contrast to linear economic models following a „take, make, dispose“ pattern.

### DIVERSIFICATION OF ENERGY SOURCES:

The bioeconomy addresses concerns about energy security by promoting the development of bioenergy as a renewable and diversified energy source. This diversification is seen as a way to enhance resilience in the face of energy supply challenges.

### DESIRE FOR SUSTAINABLE AGRICULTURE:

Conventional agricultural practices are often criticized for environmental impacts like deforestation, soil degradation, and excessive use of agrochemicals. The bioeconomy encourages the adoption of sustainable agricultural practices prioritizing ecological health and resource efficiency.

### ADVANCEMENTS IN BIOTECHNOLOGY:

Advances in biotechnology provide new tools for modifying and utilizing biological systems for various applications. These technologies enable the development of bio-based products, biofuels, and sustainable agricultural practices aligned with the goals of the bioeconomy.

### ECONOMIC OPPORTUNITIES AND INNOVATION:

The bioeconomy presents an opportunity for economic growth and innovation by tapping into the potential of biological resources. It opens new markets for bio-based products, bioenergy, and biotechnological applications, contributing to job creation and economic development.

### GLOBAL SUSTAINABILITY GOALS:

International agreements and sustainability goals, such as the United Nations Sustainable Development Goals (SDGs), emphasize the importance of sustainable and inclusive economic development. The bioeconomy aligns with these goals by promoting practices that balance economic, social, and environmental considerations.





## THE STRATEGICAL ROLE OF BIOECONOMY

The bioeconomy strategically addresses global challenges by utilizing renewable biological resources to diversify and secure our resource base. It plays a pivotal role in mitigating climate change through bioenergy, aligns with circular economy principles, and fosters economic growth and innovation across sectors like agriculture and biotechnology.

Strategically, the bioeconomy promotes sustainable agriculture practices, contributes to biodiversity conservation, and drives biotechnological advancements for improved global health outcomes. It serves as a catalyst for transitioning to a bio-based economy, reducing environmental impact.

Governments and international organizations recognize its strategic importance, guiding its responsible development through policy frameworks and international cooperation. In summary, the bioeconomy's strategic role extends beyond economic considerations, addressing complex global challenges through sustainable practices and resource efficiency.

**EAGER TO  
DISCOVER  
MORE  
?**

As you may noticed, bioeconomy is rather a broad topic. Are you interested to discover more? The European strategy and scenarios for the future are hinted below.

**CURIOS ABOUT THE FUTURE OF BIOECONOMY?**



**CHECK OUT WHAT IS IN THE EU  
BIOECONOMY STRATEGY FOR YOU!**



**DID YOU KNOW THAT THE CENTRAL  
AND EASTERN COUNTRIES ARE WORKING  
TOGETHER TO BOOST BIOECONOMY?**

