

## FOREWORD FROM THE EDITOR-IN-CHIEF

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The concept of bioeconomy was initially introduced by Nicholas Georgescu Roengen in his study on “The Entropy Law and the Economic Process” published by Harvard University Press in 1971. Bioeconomy refers to the synergy between economics and biological resources. Bioeconomy includes all the fields: producing, processing or using biological resources, in any way. Bioeconomy’s potential for innovation requires a close connection between the scientific and business components in view of further developing new types of production and manufacturing techniques, creating and capitalizing synergies as well as for increasing the efficiency of resources and value chain from the biomass production – e.g. agriculture and forestry – to the end product in the food and energy industries, as well as in the chemical, textile, paper and pharmaceutical industries. They all rely on enhanced knowledge of the fundamental process in the world of plants, animals and microorganisms. The foundation of bioeconomy represents a systemic integration of a variety of fields and their specialized knowledge: economics, engineering, chemistry, biology, physics, mathematics, agricultural and nutritional sciences, environmental sciences and social sciences.

The main objectives of bio economy are: investing in research, innovation and education, improving economic development, competitiveness and value based on a bio-approach, increased efficiency of using material resource and the bio-based value chain, securing the provision of public goods. The bioeconomy growth requires increased entrepreneurship and innovation, forging new efficient and competitive business opportunities based on new knowledge, i.e. the knowledge-based bioeconomy (KBBE). A new hybrid concept of education has emerged, with a balanced blending of educational hardware and software in the framework of new learning systems, such as: Problem-Based Learning, Project-Based Learning, Computer-Based Learning, etc.

Concerning raw materials, our main focus is on bio raw materials and bio-based natural resources (e.g. carts, forest, water). The core of bioeconomy is the production and use of biomass with biotechnology – related process, whereas bio-based products originate from biomass (agricultural plants, forestry waste, algae, marine organisms, household waste, animal waste, food industry and production except food and fodder), chemicals, pharmaceuticals, cosmetics, biopolymers, sawdust, paper and wood products.

Biotechnologies (biosynthesis technologies) have a significant impact on the food industry (producing biomass, food, etc.), agriculture, pharmaceutical and healthcare industries (antibiotics, vaccines, vitamins, enzymes, etc.) as well as environmental protection.

The main research goals for bioeconomic development are: biotechnology and knowledge-based bioeconomy, improved microorganisms and enzymes for the transformation of biomass; new and improved technological process for manufacturing products; improved animal and agricultural productivity; developing energy; conversion processes; synthetic biology – expanding the application of synthetic genes and genomes; alternative energy resource-based research (e.g. algae, biomass), artificial system synthesis (bio-bacteria) creating and developing high-value products; integrated biological production system; improved sustainability of production systems; organizational development strategies and research on the enhancement of bio economy competitiveness; intensifying bioengineering research undertaken by multi-disciplinary teams; industrial use of renewable sources; bioenergy and energy sustainability rely heavily on energy security, social equity and diminishing environmental impact; global food security – bioeconomy enables the sustainable production of products and a wide variety of healthy food products from vegetal or animal origin; capitalizing the know-how resulted from the innovative bio – activity.

To conclude, bioeconomy includes: bioenergy, biomaterials, biochemical, biopharmaceuticals, industrial bio-products in all economic areas.