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BIOECONOMY IN THE CONTEXT OF INNOVATIVE TRANSFORMATION OF THE RURAL ECONOMY AND NATURAL-RESOURCE SECTOR

Innovative development of branches of the bioeconomy is an integral condition by transiting from the raw-material economy to the innovative economy aimed at deep processing of products of the natural-resource and agrarian sector of the economy. This transformation is caused by the high rates of innovatization of agrarian transformations, scientific-technical development of the rural economy, improvement of the efficiency and reduction in periods of commercialization of agro-oriented technologies.

An increasing volume of using renewable energy sources, the occurrence of new methods and technologies for deep processing of various raw-materials as well as introduction of biotechnologies into all spheres of human vital activity become the prerequisites of formation of the background for switching the rural economy and natural-resource sector to a footing of the bioeconomy.

Active development of biotechnologies is caused not only by achievements of biochemistry and molecular biology but also by crisis phenomena in traditional technologies, first of all – in the

field of ecology and energy industry against the background of new trends, by the need to ensure food security of the state, maintain the natural-resource potential, increase in the population life expectancy and keep the nation's healthy gene pool.

Unfortunately, there are presently no special programs (concepts and other program-regulatory documents) directly aimed at developing the bioeconomy, in general, and biotechnologies directly in the sphere of agro-production and deep processing of products of the natural-resource sector. But individual directions of development of biotechnologies are traced in a row of other state development programs. First of all, it is necessary to note bioeconomic centrism in thematic studies, which were initiated by the Ministry of Education and Science of Ukraine last year [1]. Such an approach will lay, in the short and medium term, the groundwork for weaving rural development problematics and bio-economic centrism for achieving the Sustainable Development Goals within the country using the collaboration of the university science and academic institutions, for example – [2].

Despite this, in the scientific community, at the current state of the structure of the theory of bioeconomy, a uniform understanding never formed, of its essence, prime causes, theoretical and fundamental shifts in a new theorization of noospheric co-development. Its determinative methodological links are the theories in the green economy, natural resource use economy, circular economy and, although, there is the common between these categories, they all are based on different principles, so it is necessary to very carefully «pour» their provisions into the theory of bioeconomy and search for bioinnovative origin of the modernization of the rural economy and natural-resource sector – Figure 1.

Bioeconomy	Green economy	Natural resource use economy	Circular economy
<p>Assumes using biotechnologies for development of new technological processes and products, using renewable resources and efficient bioprocesses for the purpose of providing sustainable production and integration of biotechnologies into various spheres of activity</p>	<p>System of economic activity types associated with production, distribution and consumption of goods and services, resulting in the improvement of the well-being of society in the long term, without exposing future generations to considerable ecological risks or an ecological deficit</p>	<p>Reproduction of natural resources by maximally possible deceleration of exhaustion of reserves of unrenewable natural resources with the view to replacing them by other inexhaustible resources in the future</p>	<p>The ultimate goal consists in maintaining the value of products consumed and used by consumers, with a possibility to mitigate an impact on the environment through the whole supply chain</p>
<p>Based on application of biotechnologies using renewable biological raw materials</p>	<p>Provides a better quality of life for people within the ecological potential of the planet</p>	<p>Optimal use of natural resources, i.e., optimal use of them in the resource-contained environment</p>	<p>Promoting development of the efficiency of systems by identifying negative external factors and subsequent redesigning the production activity</p>

Based on conversion of renewable biological resources into bioenergy, industrial, food, feed and other kind of products with high value added	Rises the well-being of people, provides social justice and concurrently considerably reduces risks to the environment and its degradation	Capability to minimize pollution to a socially and economically acceptable level – pollution of the environment (both total and by type) may not exceed, in the future, its current level	Optimization of withdrawal of resources by circulating products, components and materials with the highest utility at all times at all stages of technical and biological cycles
Based on the systems use of biotechnologies	Directed at social development, the economic growth is associated with ecological responsibility	Exercising economic regulation and management for the purposes of harmonizing the human-nature relationship	Maintenance and growth of the natural capital by managing limited reserves and balancing renewable resource flows

Figure 1. Parallelization of Paradigms of Current Economic Development of Rural Economy and Natural Resource Use Economy

Source: grouped by authors according to [3–4]

Against the background of the COVID symptoms of development of the rural economy and natural-resource sector throughout the world, searching for methods determining a place and role of region (territorial communities) in the single economic-biotechnological space of the country by assessment of their natural-resource potential and capacities for the use of innovative technologies produced by the bioeconomy, becomes especially topical – Figure 2.

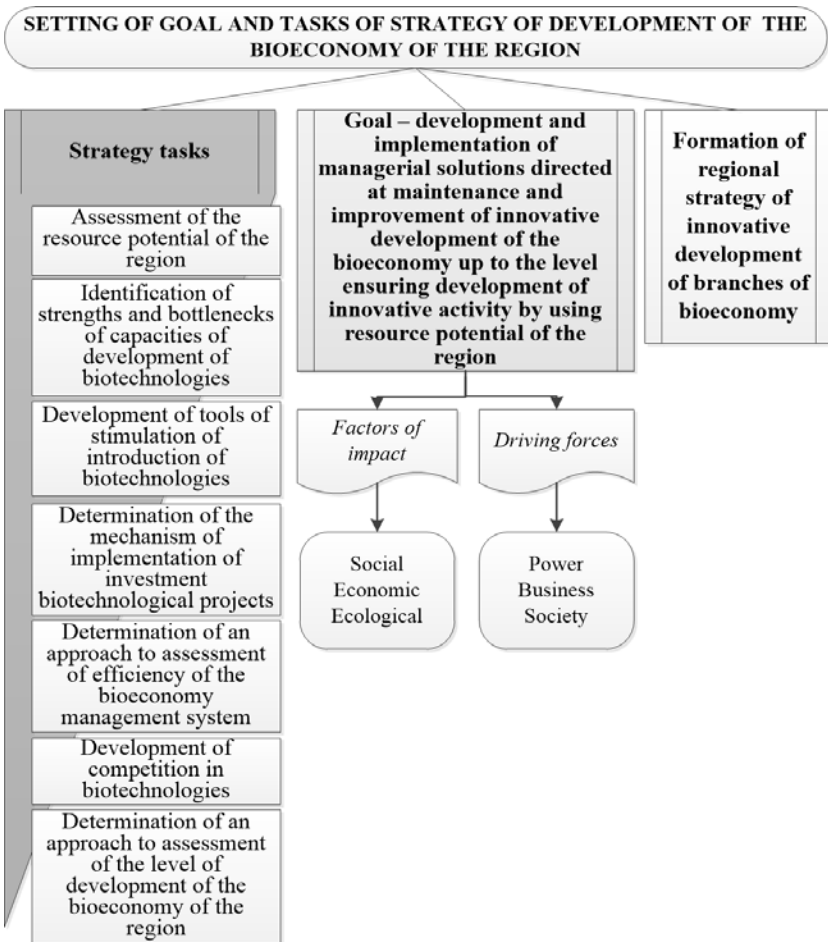


Figure 2. Economic-Biotechnological Space of Development of Agrarian and Natural-Resource Sector in Decentralization Conditions

Source: visualized by authors

The current decentralization reform in the country, chaotic bursts of the corona crisis, administrative barriers even to the evolutionary development of the agrarian sector due to restrictions to neutralize the spread of the corona virus infection, along with the growth of the

need of economic agents for innovative approaches proposed by the bioeconomy, on top of everything else, also caused the need to elaborate a method of assessment of the level of its development, subject to the optimal spatial distribution of resources determining a territorial location of branches and directions of development of the socioeconomic system (first of all, of the agrarian and natural-resource sector). In addition, there is an objective necessity for developing a systems methodological approach to efficient management of bioeconomic innovation implementation processes by the agrarian and natural-resource sectors on the basis of efficient mechanisms of interaction of the state, business community and scientific schools dealing with development of the bioeconomy.

So, the need for improvement of the energy efficiency, efficient waste use, development of the renewable energy sector on the basis of the biomass, ecologization of the agro-industrial sector, growth of sustainable development of agriculture, production of new food products, development of medical technologies and improvement of the nation's health caused the acute need not only for introduction of biotechnologies to stabilize and ensure development of the agrarian and natural-resource sector but also for neutralization of the problem of fiscal risks capable of taking, in the nearest future, resources from the financial arteries of the transition of specified sectors to the innovation-based path of development.

Innovations are an integral part of the bioeconomy. In our opinion, innovative development of the agrarian and natural-resource sector by means of bioeconomic innovations represents a system of economic relations, which includes the aggregate of accumulated knowledge, technologies and resources able to convert themselves for new trends and demands of the technological setup of biotechnologies aimed at improving the nation's health; a healthcare level; providing people with quality and safe food; solving ecological problems; using renewable

resources in the food and energy industry to reduce dependence on fossil raw materials, in particular, gas.

A new managerial theorization of the bioeconomy at the current stage enables to use the tools of development of innovative processes in the agrarian and natural-resource sectors and the availability of the efficient bioeconomy management system will create comfortable conditions for implementation of biotechnological complexes, will enable to stimulate increasing in tax revenues of local budgets, will increase local employment of the population and development of infrastructure that, in its turn, will have a favorable impact on the level of socioeconomic development of the region, in general, and of a specific territorial community, in particular, will considerably expand the scales of using biotechnologies for mass agroproduction of products with new properties, will enable to more efficiently work with economic and financial stakeholders displayed as local regulation programs, foundations of development of the bioeconomy, formation of the bioinvestor class as well as will create favorable prerequisites for innovative bioeconomic development of the rural economy and natural-resource sector.

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