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INNOVATION TECHNOLOGY IN BIOENERGETIC

The economic efficiency of growing energy crops depends on their yield and costs for harvesting and processing into biofuel. Since most energy plants provide a harvest for more than one year, the initial investment in the necessary equipment and technical means, as well as the production costs, will pproximately pay off in the next 2-3 years, provided that the appropriate technology and proper care of their plantations are followed. Energy crops are grown on land that is not suitable for agricultural production, therefore, it allows to preserve the soil from erosion, increase the content of the humus layer, and improve the state of the environment.

In Ukraine, only 5.4 thousand hectares of land are allocated for energy plants. At the same time, the country has from 1 to 4 million hectares of degraded and unproductive agricultural land, on which the cultivation of traditional agricultural crops is economically ineffective. Such lands can be used for growing energy plants, which are undemanding to the quality of soils and are able to restore their fertility [1]. As a result of military operations, the area of land temporarily unsuitable for productive agricultural production is expected to increase. According to expert estimates [2], energy plants can completely replace traditional fuel. Cultivation of energy crops even on 1 million hectares can replace half of all imported gas. [2]

Improving the level of food security of the country and ensuring profitable agricultural production depends on the availability, efficient use and expanded reproduction of the resource potential of agricultural enterprises, an important part of which is natural resources. Instability of economic processes, involvement in the process of production of an uncontrolled amount of resources is one of the reasons for the deterioration of the environment and living conditions. Therefore, it is time to create the prerequisites for the transition to a new level of resource consumption, which involves the introduction of effective resources for resource conservation through the use of both market leverage and state regulation of the use of natural resources.

The bioeconomy is a young industry in the world economy, and in the future is able to activate the development of society at a new socio-economic level. The bioeconomy is a key basis for innovative development in the context of globalization [3].

The modern interpretation of bioeconomics is that it as a science is based on the knowledge of economics and biology, even though the main materials for production should be renewable biological resources. The above definitions emphasize the value of biological materials, intersectoral collaboration and the perspective of this science.

Bioeconomy has three main components: the use of bioprocesses and renewable biological resources to create sustainable production, combine knowledge in biotechnology and apply them to different sectors, develop new products through gene and cellular processes. An integral part of this science is biotechnology, the main purpose of which is the modification and alteration of microorganisms for new ways of their practical use in production and health. So biotechnology is any technology that uses living organisms to produce a product for practical use.

Bioeconomics is an economy based on the use of biotechnologies that use renewable biological raw materials [4]. The development of bioeconomic sectors includes energy efficiency improvement, efficient use of waste, development of renewable energy based on biomass, greening of the industrial sector, increase of sustainability of agriculture, production of new food products. This involves addressing major problems, both now and in the future. These include the sustainable production of sufficient nutritious and safe food for our growing population, the creation of additional jobs and increased employment, the development of

new and greener sources of energy and the fight against global warming. We focus our attention on South Africa because the country has a holistic, well-defined bioeconomy strategy that is consistent with the conditions of developed nations more generally. The review suggests that developing countries could adopt a multidisciplinary approach to designing their bioeconomy strategies. We further assert that developing holistic strategies that address the recent COVID-19 pandemic and potential future world crises could be beneficial in achieving sustainable development goals. Increasing the area for growing energy crops, which includes, in particular, fast-growing trees (plantations of various types of willow and poplar, paulownia) or other types of plants (sorghum, miscanthus

At the same time, there are a number of arguments that significantly reduce the enthusiasm of supporters of the bioeconomy, namely the intensification of competition for raw materials, which is necessary for both food and fuel production, which can lead to a significant increase in food prices and the need for significant "start-up" costs for the transition to biobased technologies.

The approximation of Ukraine to the requirements of the European Union in terms of implementation of the provisions of the Energy Charter will also be a positive effect. Also, from the increase in the use of energy from renewable sources of revenues to the state budget at the expense of income tax for the period 2011-2030 is projected to the amount of 158 billion UAH, and to 2055 - 860 billion UAH. In addition, budget receipts of all levels will increase due to payroll, rent, compensation for the prevention of harmful emissions, etc. [5]. This is an objectively advantageous path, it is important to start it only.

Ukraine is a passive participant in the global process of agricultural biotechnology development. The main reasons for this state of affairs, along with the traditional lack of budgetary funding, are the lack of a systematic basis for the development of agrarian bioeconomics (in particular, clear target and regional benchmarks) and the existence of significant organizational weaknesses [6]. But the prospects for the development of bioeconomics on a scientific basis in Ukraine are encouraging, and the development of bioeconomics must be accompanied by a number of innovative processes in the society and economy of the state. Indicators and tools must be developed to assess the progress of the stated goals and strategies; agree on goals and take into account the development of investment in research and sponsor research for the development of the bioeconomy. Several countries around the world are taking advantage of emerging technologies to leverage the use of natural resources to develop and grow bio-based industries [3].

As a result, these activities have become the backbone of bioeconomy-growth strategies in the developing world. Adoption of the concepts and technological aspects of this facet of the Fourth Industrial Revolution (4IR) across government, academia, and industry has fostered innovation in the health, agricultural, and manufacturing sectors. However, the relationship between the technological catalysis of innovation and the bioeconomy from the perspective of a developing country has been left unexplored. In this context, this review

explores the contribution of technological advances toward a sustainable, valuable bioeconomy and the current policy mandates.

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