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# Possibilities of Bio Economic Development in Uzbekistan

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**Abstract:** The article emphasizes the need for the development of bioeconomy in the conditions of a reduction in natural resources. The essence of the term bioeconomics is revealed on the basis of the views of the author and foreign scientists. Proposals for the development of bioeconomy in the Uzbekistan have been developed.

**Keywords:** biodiversity, bioeconomics, green economy, biotechnology, agriculture, forestry, water management, natural resources.

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**Introduction.** Rising demand for food around the world, declining natural resources, loss of biodiversity and climate change are calling us to develop a bioeconomy based on renewable natural resources. The depletion of biodiversity resources is primarily due to the impact of human activities. Over the past 50 years, the population of the planet has increased 3.5 times, the volume of drinking water consumed 11 times, arable land 2 times, the number of registered vehicles 10 times, the use of oil products 7 times, the capacity of power plants 21 times. Fauna and flora species decreased by 20 percent. Every year, 5 billion tons of carbon dioxide, 200 million tons of carbon monoxide, 146 million tons of sulfur oxides and 35 million tons of nitrogen oxides are released into the atmosphere. As a result of irrational human activities, many dangerous processes are taking place in the biosphere. In 2030, the world will need 50% more food, 45% more energy and 30% more water than it does now. Growing demand leads to a shortage of natural resources and increases their cost. Thus, the availability of raw materials and the efficiency of their use will become a new competitive advantage. Increased attention to the environment and stricter legislation will also be a factor in the production of products that have a less harmful impact on the environment. This global development lays the groundwork for change in the bioeconomy. Bioeconomics is not a new industry; it is a combination of several major manufacturing and processing industries.

Bioeconomics is generally recognized as a prospect of saving the Earth's energy resources, as its main areas are the development of alternative energy sources and energy efficiency, efficient use of waste, development of biomass-based renewable energy, greening the industrial sector, increasing agricultural sustainability, new food production, development of medical technologies, use of biotechnologies based on renewable biological raw materials, etc.

Food shortages associated with world population growth as a key condition for bioeconomic development; limited resources of minerals, raw materials and energy; environmental pollution and damage to the environment; accelerating space exploration; the Fourth Industrial Revolution and the Quantum Computing Approach, which changed the mental model of man, changed his way of life, and contributed to the formation of a new system of institutions; change in science, the rapid development of biotechnology as a science, the emergence of nanotechnology and nanotechnology; factors such as individual acceleration of technological development rates can be recognized.

The development of bioeconomics in our country, based on the experience of developed countries and local experience, is one of the pressing issues.

**Analysis of the relevant literature.** The concept of bioeconomics is interpreted differently by scientists and experts. According to D.N. Lyjin [Д.Н.ЛЫЖИН], bioeconomics: a) is one of the main innovative areas of sustainable development of the country's economy; b) the end of the XX century - based on the achievements of the "biotechnological revolution" of the beginning of the XXI century; c) based on the principle of cluster approach, public-private partnership and integration of technological platforms. The economy of the new technological order - bioeconomics should be based on the principles of sustainable harmonious development of the system "economy-society-biosphere", which solves the problems of growth and self-organization of the old model [3].

According to N.V. Akkanina and M.A. Romanyuk [Н.В.Акканина, М.А.Романюк], bioeconomics is often considered as an economic mechanism for the implementation of biotechnology, ie a new branch of the existing technological order [1].

A.E. Suleymankadieva takes a scientific approach to bioeconomics as a social science that combines biological and economic sciences, and as a cognitive approach, combines the knowledge and cognitive principles of economics with all other sciences, primarily biology, biotechnology and others. as the basis for the formation of a new bioeconomic science. Economics is based on three "pillars" of knowledge: 1) the use of knowledge about genes and cell processes to design and develop new products; 2) use of renewable biological resources and efficient bioprocesses to promote "sustainable" production; 3) combines knowledge in the field of biotechnology and emphasizes its application in different fields [4].

One of the Uzbek scientists, A.A. Isadjanov "Green economy" is the economy of tomorrow and it is the driving force of economic development of the XXI century, the theory of green economy is based on three axioms: - the sphere of influence can not be continuously expanded in a confined space; - in the context of limited resources, it is impossible to demand a continuous increase in demand; "Everything on earth is interconnected," he said [5].

M.A.Oripov in his scientific article "Needs and opportunities for the development of bioeconomic sectors in Uzbekistan" called for the widespread introduction of circular production and further revitalization of clusters in the sector to ensure the rapid growth of bioeconomics in order to achieve food security and security. emphasizing the need to create value-added bioproducts and increase their exports, citing a number of other areas of bioeconomic development[6].

The need for further improvement of scientific research in the field of bioeconomics and related green economy by Uzbek scientists and experts led us to choose this topic as a research topic.

**Research methodology.** During the study, legal, theoretical and practical sources related to the development of bioeconomics in our country and abroad were studied. Data from the Statistics Committee of the Republic of Uzbekistan were used for the analysis. Systematic analysis, scientific observation, expert evaluation, monographic study, systematic and logical approach methods were widely used during the research.

**Analysis and results.** The calculations show the potential significant impact of bioeconomy on growth, competitiveness and job creation across the entire biomass value chain. According to the OECD (Organization for Economic Co-Operation And Development) (2009) report, by 2030, the "typical business" in the region (OECD) estimates that the bioeconomy could account for about 2.7 percent of GDP (39 percent of industry, including agriculture). 36 percent of the economy and 25 percent of the health sector). The report shows that the main

factors in generating profits from bioeconomics will depend on the “quality” of management and the economic competitiveness of biotechnology.

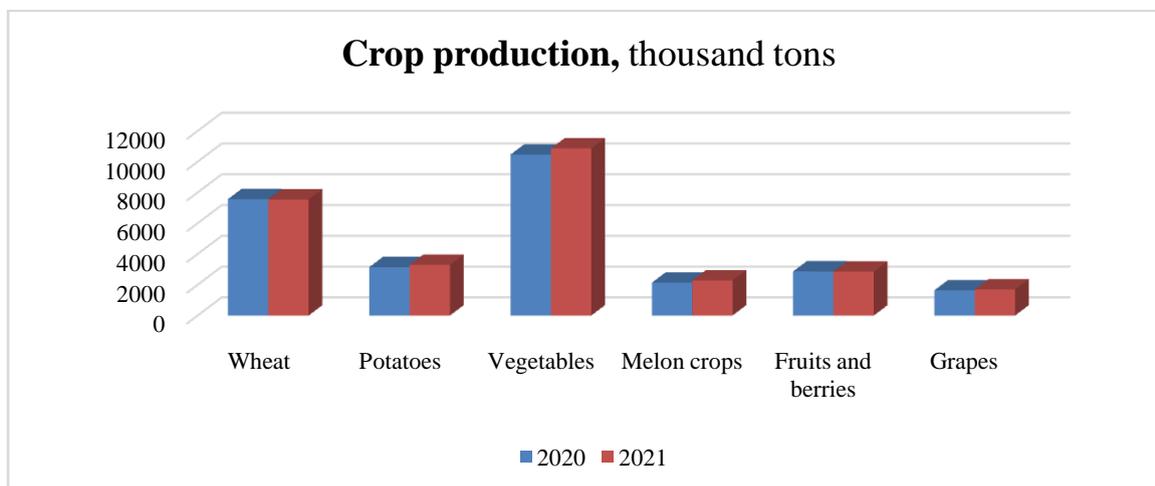
Priorities for the development of bioeconomics in Uzbekistan can be identified as follows:

1. Agriculture, fisheries and forestry;
2. Biomedicine, biopharmaceuticals and biodiagnostics;
3. Food technology;
4. Industrial biotechnology;
5. Bioenergetics;
6. Aquaculture;
7. Desert biotechnology;
8. Bioprocesses and biofermentation.

**There are the following reasons for the development of bioeconomics in Uzbekistan:**

**First**, agriculture is central as a major supplier of biomass to food and other biological resource-based industries. We have a lot of opportunities for agricultural development. In 2020, all categories of farms will produce 7566.6 thousand tons of cereals (1.7% more than in 2019), 3143.5 thousand tons of potatoes (1.7% more), 10459.5 thousand tons of vegetables (2 , 4% more), 2134.4 thousand tons of melons (3.2% more), 2864.0 thousand tons of fruits and berries (4.0% more), 1 639.2 thousand tons of grapes (2% more than 2019).

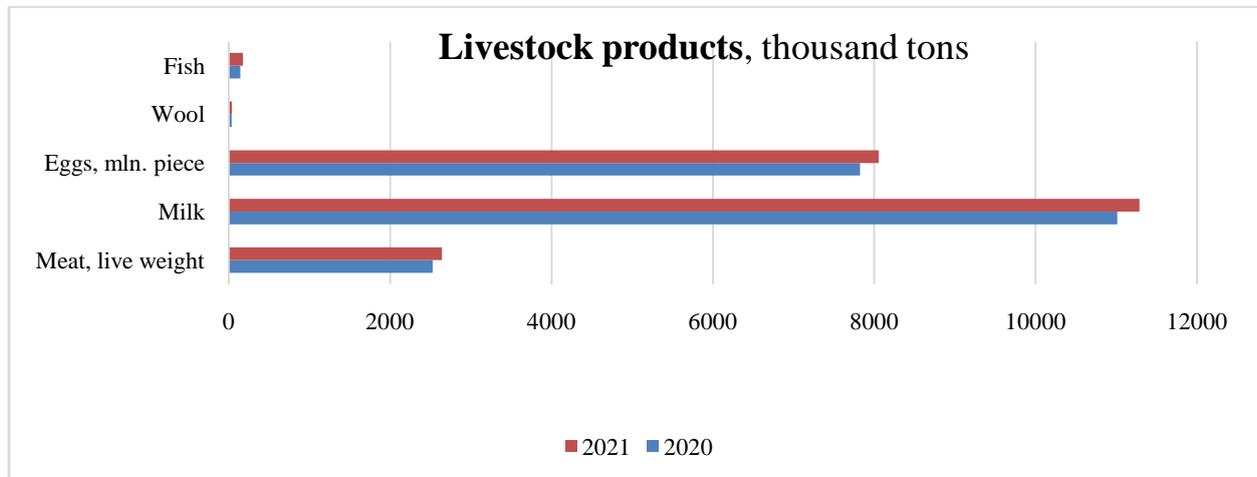
In 2021, all categories of farms will produce 7540.9 thousand tons of cereals (1.2% less than in 2020), 3292.3 thousand tons of potatoes (4.7% more), 10859.3 thousand tons of vegetables ( 4.1% more), 2281.1 thousand tons of melons (6.9% more), 2852.5 thousand tons of fruits and berries (1.4% more), 1695.1 thousand tons of grapes (5.5%) % more) were grown.



**Figure 1. Indicators of the volume of agricultural products grown in Uzbekistan.**

Consistent implementation of measures to increase the domestic capacity of the livestock sector, as well as the provision of systematic assistance to them by the state has allowed to increase the number of livestock, to fill the domestic consumer markets with livestock products. In 2020, all categories of farms will produce 2526.2 thousand tons of meat in live weight (2.1% more than in 2019), 11009.9 thousand tons of milk (2.8% more), 7 825.0 mln. eggs (an increase of 0.7%), 35.7 thousand tons of wool (an increase of 1.5%) and 144,085 tons of fish (an increase of 18.4%) were caught.

By 2021, all categories of farms will produce 2640.4 thousand tons of meat in live weight (4.8% more than in 2020), 11286.9 thousand tons of milk (2.8% more), 8053.1 mln. eggs (up 3.5%) were raised and 173,866 tons of fish (up 20.7%) were caught.



**Figure 2. Indicators of the volume of livestock products grown in Uzbekistan.**

The food and agriculture sector faces many challenges. This includes the growth of the population and their incomes, as well as the growing global demand for environmentally friendly and organic products, as well as meeting the demand for biomass supply to meet the needs of the energy and industrial raw materials sectors. In addition, the sector needs to adapt to climate change.

Meeting these requirements will increase the pressure on the agro-food sector to supply food and raw materials from scarce natural resources, while preserving the environment in the face of climate change. Solving these problems in a sustainable way requires the development of new products that can mitigate the effects of climate change and the improvement of existing technologies and practices.

**Second**, there are problems with the rational use of land resources, water resources and other natural resources that hinder the development of agriculture. Only 20.7% of the 20.2 million hectares of agricultural land are irrigated. Over the last 15 years, per capita irrigated land has decreased by 24 percent (from 0.23 to 0.16). This is due to population growth, reduced water supply and the transfer of agricultural land to other land categories. It is projected that over the next 30 years, irrigated land could shrink by another 20 to 25 percent.

In recent years, desertification and land degradation have increased, resulting in varying degrees of environmental problems. For the Republic of Uzbekistan, whose territory is 80% desert and semi-desert, the issues of combating desertification and drought are a priority in ensuring sustainable development.

At present, about 10 mln. hectares of pastures need radical improvement. Repeated grazing of cattle on the same pasture, cutting down trees for fuel and other purposes has led to a significant reduction in tree-shrub vegetation in the desert zone.

There are about 1 million sand dunes in the country. hectares, and two hundred thousand hectares of these lands have recently emerged around irrigated areas. This poses a serious threat to the acceleration of the desertification process. Land degradation also occurs in irrigated areas involved in agricultural production.

About 80 % of the country's water resources are formed by transboundary water bodies. This situation underscores the importance of regional cooperation for sustainable water

management in Central Asia, particularly in the Republic of Uzbekistan. 70% of the country's irrigation networks do not have anti-filtration coatings, resulting in some water being lost during field delivery. According to the analysis, although billions of cubic meters of water are directed to arable land in Uzbekistan, only 60% of it reaches the crops, 40% is lost in irrigation systems and the irrigation process. The existing irrigation infrastructure, most of the pumping stations, have been in use for more than 30-40 years and are in need of reconstruction or overhaul.

The situation may be further complicated by the continued use of traditional irrigation methods due to the high dependence of agriculture on irrigation and the sharp increase in drought as a result of climate change.

According to the forecast of the World Resources Institute, by 2040 Uzbekistan will become one of the 33 countries with the highest water shortages. Decreased productivity has serious negative consequences for food security and balance of payments, which necessitates the sustainable management of water resources and the use of resource-saving technologies in the cultivation of agricultural crops.

Although there are minimal agro-environmental standards in the country, most of them are based on old technologies. Environmental factors are not taken into account in the development of agricultural practices. Improving agro-ecological practices and integrating environmental factors into the development of standards and mechanisms for the protection of natural resources is required.

**Third**, one of the main components of biological resources in the country is forest lands, which cover 11.1 million hectares or 25% of the total area. Forested areas cover 3.2 million hectares (29 percent).

In recent years, the Government has paid special attention to the management of forest resources. In 2017, the State Committee for Forestry was established, a number of measures were taken to expand the forest area to 2.3 million hectares, establish 12 new forestries and strengthen the material and technical base.

Also, work has been done to establish forests on the dried surface of the Aral Sea, expand the area of protected forests, increase wind-protected green corridors on agricultural lands, create an excellent monitoring system and improve environmental education programs.

At the same time, effective management of forest resources is a key priority for sustainable development of agriculture and rural areas, aimed at reducing the negative impact on the environment and climate as a result of irrational use of forest resources.

**Conclusions and recommendations.** Biotechnology is expected to become the fastest growing field in the 21st century. According to leading experts, by 2030, biotechnology will provide 2.7% of GDP in developed countries. The contribution of biotechnology will be even greater for developing countries. Based on the use of biotechnological developments, by 2030, 80% of medical products, 35% of chemical products and 50% of agricultural products will be produced. By 2050, the global bioenergy market will provide \$ 150 billion, with 30 percent of global energy demand coming from renewable sources. Among the countries, the greatest achievements in the development of biotechnology have been made by the United States, Germany, the United Kingdom, China and Japan.

Given the dependence of agriculture on biological resources, agro-food systems play an important role in many bioeconomic strategies. The contribution of the bioeconomy to the innovative development of agriculture in the country can be seen in the use of biotechnologies to create new strains and protect the environment. The introduction of

biotechnology allows to reduce the cost of production in industry and agriculture, increase the availability of medicines and the quality of medical diagnostics and treatment, improve the environment.

It is very important to identify and implement sustainable biomass production mechanisms. It is important to encourage policies to apply sustainable farming methods that help maintain soil cover and health, increase water use efficiency, and reduce soil erosion.

For the development of bioeconomics in Uzbekistan, we consider it expedient to:

- Further improvement of legal, economic and financial mechanisms to support industries and enterprises in this sector of the economy;
- Expanding the training of bachelors and masters in bioeconomics, taking into account that the effective implementation of the strategy for the development of bioeconomics and "green" economy in the country depends on the skills and experience of personnel in this field. Currently, in 4 universities of the country, starting from the 2022-2023 academic year, practical work is underway to open a master's degree in "Bioeconomics" on the basis of a foreign grant. In the future, it is advisable to organize bachelor's and master's degrees in all higher education institutions on the basis of local grants.

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