

STRATEGICAL ASPECTS OF DEVELOPMENT OF BIOECONOMY IN BUKHARA REGION

Abstract

The article is devoted to the analysis and prospects for the development of the leading bioeconomic sector - agriculture in the Bukhara region. Based on a study of the Bioeconomic Development Strategy of individual countries and a study of the dynamics and growth trends of agriculture in the Bukhara region, a proposal for further stable growth of the agricultural sector of the region was developed and recommendations were formulated for the development of a promising bioeconomic development strategy for the region.

Key words: *Green Economy, Agriculture, bioeconomy sectors, development, Strategy, Sustainable development*

I. Introduction

At the global level, reducing the extraction of minerals, saving natural resources, preserving biodiversity, and achieving sustainable development through the effective use of produced renewable goods and bioproducts and their waste are the urgent problems of the present time, special attention is being paid to the development of the economy and the developing bioeconomy as its component. Special attention is being paid to the development of the green economy in our country. For example, the President of Uzbekistan Sh.M. Mirziyoev: "... Currently, as in the whole world, serious environmental problems are emerging in Uzbekistan. In most of our regions, the composition of the soil is deteriorating, fertile land is shrinking, desertification, water shortage, drought, providing the population with clean drinking water are among these and they should become the culture and practical action of the residents of a neighborhood. In general, if we do not switch to "green energy" as soon as possible, if we do not define specific mechanisms in this regard in our laws, we will not be able to satisfy our residents and entrepreneurs." [1].

Considering a component of the green economy, a lot of attention is being paid to the development of bioeconomy on a global scale. Because bioeconomy is the production of products that replace natural resources by creating higher added value from biomass (i.e. renewable biological products) and on this basis, natural serves to reduce resource extraction. Therefore, the development of Bioeconomy is very important. In the report of the International Advisory Council on Global Bioeconomy, the Bioeconomy is defined as follows: "Bioeconomy is the knowledge, science, technology and innovation related to the production, use, conservation and restoration of biological resources and the preparation of sustainable solutions (information, products and services) is to turn all economic sectors into a stable economy" [2].

It should be noted that currently, programs and strategies for the development of Bioeconomy are being developed and implemented in a number of countries of the world. Despite the fact that branches of bioeconomy have been developing in our country for a long time, the term bioeconomy is rarely used in the Uzbek language. This requires the passage of time and the acceleration of scientific research in the field. However, our country has a very high production and scientific potential for the development of Bioeconomy.

Due to the fact that the problem has been studied - the phrase "Bioeconomy" is new in the language of communication in Uzbekistan and this field is new, no monographic studies on Bioeconomy have been conducted in our country.

It should be noted that currently in our republic there is a project "New master's education program for sustainable bioeconomy in Uzbekistan" (BioEcUz), 619294-EPP-1-2020-1-LV-EPPKA2-

CBHE-JP, financed by the Erasmus+ program of the European Union. The report on "Detailed analysis of the bioeconomy system and key stakeholders in the field", prepared by the consortium of partners for the first time, continues to be the only research conducted on bioeconomy in our country.

"The report includes an analysis of three key components of the bioeconomy education ecosystem:

1. Evaluation of involved higher educational institutions (HEIs) and brief review of information on other higher educational institutions in Uzbekistan that provide education in the fields of bioeconomy.
2. Brief description of bioeconomy and related industries in Uzbekistan and other related industries in Central Asia.
3. Analysis of the bioeconomy sector of Uzbekistan, including national strategies, policies and development programs related to bioeconomy, analysis of state bodies responsible for their preparation, adoption and monitoring. [3]

However, in a number of countries of the world, many strategic documents on the development of bioeconomy and related fields have been developed by the state and are being implemented. In 2009, the Organization for Economic Co-operation and Development (OECD) designed the Bioeconomy to 2030 policy agenda (The Bioeconomy to 2030 Designing a Policy Agenda) was published under the responsibility of the Secretary General of the OECD. In this 326-page document, emphasis is placed on the development of biotechnology, scientific and innovative research, industry, especially the processing industry, the market of bio-based products, and the education system in the sustainable development of the bioeconomy. The implementation of the bio-economic policy is based on the coordinated actions of the private sector, state and non-state organizations and increasing investment activity in the field.

Also, in the document, special importance is given to issues such as effective use of biological resources, creation of new bioproducts, optimization of natural resource use, reduction of waste disposal into the environment and their safety, food safety, preservation of biodiversity, and balanced development of society and economy. and bioeconomy development scenarios until 2030 are based on [4]. As a promising field, the bioeconomy continues to show great importance in solving and mitigating global problems.

For example, the Bioeconomy strategy of the European Union is considered one of the main factors of sustainable development, and it represents the "Green course" of the transformation of the Union.

Bioeconomy policy aims to build a bioeconomy that covers all three dimensions of sustainability:

- 1). Environment: management of land and biological resources within ecological limits;
- 2). Economy: sustainable value chain and consumption;
- 3). Society: Social Justice and Just Transition[5].

It should be noted that the Bioeconomy strategies of the European Union are aimed at defining the main directions of sustainable development of the bioeconomy sector in member countries and strengthening scientific cooperation and integration relations between countries in the further development of the sector based on new innovative technologies. It serves as a methodological tool in defining bio-economic strategic documents and directions.

For example, the Nordic Bioeconomy program consists of 15 points, which includes comprehensive measures for the development of bioeconomy, which are of great importance for the national economy of the countries of this region. The objective of the program is to create new industries and high added value chains and to facilitate and guide the transition of bio-based industries to technologically advanced sectors, optimizing biomass production and new value creation.

The program relies on four pillars defining the perspective of the Nordic bioeconomy: - a competitive biobased industry - sustainable resource management - sustainable and diverse ecosystems - inclusive economic development [6].

It can be said that currently in a number of countries of the world strategies and programs for the development of the green economy and its component bioeconomy are being prepared and implemented. For example, in 2012, the USA (National Bioeconomy Program) [7], Sweden (Swedish Research and Innovation-Bioeconomy Strategies), [8] and in 2013, the countries of South Africa (Bioeconomy Strategy) [9] were the first to develop and implement their own bioeconomy strategies. Many such examples can be given. In general, due to the increase in the number of countries that have developed and implemented bioeconomy strategies in recent years, Bioeconomy is developing at a relatively high pace globally.

II. Research methods.

The research was carried out in a traditional way by studying information and literature. Recent literature sources and published information on policies and strategies for bioeconomy development were analyzed. Statistical data on bioeconomy sectors were comparatively analyzed. Based on the synthesis and scientific abstraction and extrapolation of the results of the analysis, opportunities and strategic aspects of the perspective development of bioeconomy in Bukhara region were determined.

III. Analysis and results

The development of Bioeconomy in the territory of our country: agriculture and forestry, processing of agricultural products, preparation of bio-based medicines has a very long history. At the present time, agriculture, which is the main source of biological products in our country and its regions, is developing among the leading sectors.

According to the data, in 2022, 45.5% of the Bukhara region's gross regional product corresponded to the share of agriculture, forestry and fisheries, and the region's volume of production of gross agricultural products was 32,867.5 billion soums. A total of 620,100 tons (4.3% more than in 2021) of grain were produced in farms of all categories of agriculture (Table 1).

As can be seen from Table 1, there was no significant change in the production of cotton raw materials and grain in the region during 2010-2022. During the period of analysis, the production volume of the remaining types of products in the table grew at a high rate. In particular, the production of honey in the region increased 5.7 times over the past 12 years, which means that there have been positive changes in agricultural production in the region in recent years.

Table 1. The dynamics of the production of basic agricultural products in all categories of farms of the Bukhara region in 2010-2022*

	Product type	Unit of measure	2010 y.	2015 y.	2020 y.	2021 y.	2022 y.	2022 % compared to:	
								2010	2021
1	Grain, all	thousand tons	620,143	680,592	546,340	594,456	620,11	99,99	104,32
2	Cotton raw materials	thousand tons	342,0	359,4	257,8	304,3	310,1	90,67	101,8
3	Potatoes	thousand tons	115,165	182,478	222,724	234,496	251,333,	2,2 times	107,18
4	Vegetables	thousand tons	354,798	567,203	768,672	831,788	889,542	2,5 times	106,94
5	Food melons	thousand tons	79,561	125,167	175,927	178,980	198,296	2,5 times	110,79
6	Fruits and berries	thousand tons	150,862	239,896	303,531	267,978	291,963	193,53	108,95

7	Grapes	thousand tons	99,956	175,972	205,073	205,660	216,821	2,2 times	105,43
8	Meat (in live weight)	thousand tons	140,211	195,426	262,723	278,472	286,589	2 times	102,91
9	Milk	thousand tons	539,315	779,103	1 002,601	1 020,950	1 051,801	195,03	103,02
10	Eggs	thousand pieces	173 695,0	320 052,0	469 847,0	477 504,0	519 679,0	3 times	108,83
11	Honey	thousand tons	0,405	1, 233	1, 946	2, 160	2, 292	5,7 times	106,11
12	Wool	thousand tons	2, 776	3, 634	3, 842	3, 977	4, 129	148,74	103,82
13	Karakol skins	pieces	333 311	410 491	500 888	545 383	565 814	169,76	103,75

*The table was prepared based on the data of the State Statistical Office of Bukhara Region

In 2022, there was an increase in all types of the main agricultural products produced in the region. In particular, the production of food products, fruits, vegetables, eggs and honey increased rapidly. Deepening reforms in the agrarian sector of our country is of great importance in achieving such indicators. In recent years, special attention has been paid to the planting of other crops and the establishment of gardens in the cotton and wheat fields with low productivity, as well as to the planting of repeated crops in the fields empty of wheat and the introduction of intensive and innovative technologies in the field. being directed. In this regard, the President of Uzbekistan Sh.M.Mirziyoyev expressed the following opinion: "This year, for the first time, vegetables, potatoes, pulses and legumes were planted on nearly 1 million hectares of land freed from grain, and more than 5.5 million tons of products were grown.

Our systematic work on increasing the income of farmers through the diversification of agriculture, more rational use of land and water resources, and the production of exportable products is gradually bearing fruit.

For example, instead of cotton and grain on 96,000 hectares of low-yielding areas, cabbage, various vegetables and greens were planted on 32,000 hectares of land this year, and thousands of tons of products from these areas were exported. Also, intensive orchards and new vineyards were built on 11,000 hectares, greenhouses on 1,500 hectares. In this regard, special attention was paid to the extensive use of the advanced experience of Spain, Poland, the Netherlands, Greece, Russia, China, South Korea, Turkey, Vietnam and Indonesia"[10].

According to the data, in 2022, 921.5 thousand hectares of grain were harvested in our country, so 853 thousand hectares were cleared of straw. Repeated crops were placed on 616.5 thousand hectares of these areas. In particular, 70.4 thousand hectares of vegetables, 29.9 thousand hectares of rice, 2.6 thousand hectares of potatoes, 27.4 thousand hectares of oil crops, 219.5 thousand hectares of legume crops, 14.7 thousand hectares of corn for grain, 59 8,000 hectares of rice, 156,300 hectares of fodder crops, 30,100 hectares of millet and 5,700 hectares of broom were planted"[11].

As a result of these measures, the volume of production of agricultural products tends to increase. It should be noted that in recent years, there have been changes in the structure of agricultural arable land in the Bukhara region: in 2022, the agricultural arable land of the region was 222,019 hectares, an increase of 110.5% compared to 2017. That is, as a result of implementation of irrigation and melioration measures on agricultural land areas in the region, new land areas were brought into circulation. During this period, the cultivated area of wheat decreased by 11,280 hectares and the area of grain by 4,000 hectares, while the cultivated area of vegetables amounted to 7,732 hectares in 2022 and increased by 2,232 hectares compared to 2017. [12].

At this point, it should be said that the increase in the volume of production of agricultural products in the region was influenced by the expansion of cultivated areas, as well as the increase in the productivity of crops and the productivity of livestock. For example, the average yield of cotton in the region in 2022 was 36.2 centners per hectare. This indicator was around 28.6 centners in 2017. Compared to 2017, grain yield increased by 10.2 centners per hectare and reached 74.4 s/ha in 2022. Also, in the Bukhara region, according to the Resolution of the President of the Republic of Uzbekistan PQ-373 of September 10, 2022 "On additional measures to increase the income of the population by supporting the establishment of farms" 2022 As a result of the allocation of 8016 hectares of land to the population for the establishment of farms, 67997 tons of agricultural products were produced in these areas, which had a positive effect on the increase in the volume of gross regional agricultural products. According to our analysis, the rapid development of plant breeding in the region during the period of analysis has not only provided the population with food, but also the industry with raw materials for plant breeding, as well as the strengthening of the livestock feed base. As a result, the number of cattle has increased in Bukhara region in recent years (Table 2):

Table 2. The dynamics of the number of certain types of livestock in all categories of farms of the Bukhara region in 2010-2022 *

Order No.	Livestock type	Unit of measure	Years:					2022 % compared to:	
			2010	2015	2020	2021	2022	2010 y.	2021 y.
1	Cattle	One thousand heads	883,9	1100,5	1247,5	1285,3	13 28,9	150,3	103,4
	From this: of cows	One thousand heads	365	378,9	407,5	422,3	434,7	119,1	102,9
2	Sheep and goats	One thousand heads	1563,2	1825,1	2239,8	2304	2416	154,5	104,9
3	Poultry	One thousand heads	1663,3	2909,2	5781	6235,7	6721,2	4 times	107,8

*The table was prepared based on the data of Bukhara regional statistics department.

The data of Table 2 show that in Bukhara region in 2010-2022, especially poultry farming grew at a very high rate. It should be noted that the Bukhara region has seen positive changes in the development of forestry in recent years. According to data, the gross output of forestry farms in Bukhara region in 2022 was 201.4 billion soums (101.7% increase compared to 2021). During 2017-2022, the grossly produced forest products increased by 2.6 times. It is also worth noting that in Bukhara region, along with agriculture and forestry, the volume of fish production increased by 3.9 times and amounted to 194.8 billion soums in 2017-2022. According to our analysis, the measures implemented in agriculture in Bukhara region during the last years are giving good results.

IV. Conclusion

In short, especially in the last 5 years, the agriculture, forestry and fisheries of Bukhara region have developed at a relatively high pace, and the supply of food products to the population has also improved. However, there are a number of opportunities and reserves to further increase gross product production and increase production efficiency and ensure sustainable development in the sector. In order to ensure efficient and effective use of these opportunities and reserves, it is necessary to develop a strategy "Development of the bioeconomy sector of Bukhara region in 2025-2030". Because the region has not developed a strategic document aimed at the development

of bioeconomy through wide use of existing opportunities. However, in Bukhara region, the mechanism and prospective parameters of effective use of the existing opportunities to increase the volume of biomass production and increase the level of its added value creation chain have not been sufficiently developed. For example, promising varieties of wheat with a potential yield of 100 centners/ha and higher have been created at the present time. When such varieties are planted in the region and the average yield of wheat reaches 100 centners, its cultivated area remains at the level of 73423.5 ha in all economic categories in 2022, in the future, in the region, in addition to this area: $(100 \text{ centners/ha (potential)} - 64.9 \text{ quintals/ha (2022 average yield of wheat by region)}) = 35.1 \times 73423.5 = 2577164.85 \text{ quintals}$ or 257.7 thousand tons of wheat can be obtained.

At this point, it should be said that in 2022, from the existing agricultural arable land in the region, due to the testing and planting of promising varieties with high productivity, as well as the application of intensive and innovative technologies of production, additional (compared to 2022) 20-25 % There is a possibility to produce % more crop products. Also, it is possible to produce a large amount of animal feed, forest products and medicinal plants in the region due to the production of animal feed based on hydroponic technology and the improvement of pastures and deserts.

In Bukhara region, it is possible to increase the volume of production of agricultural products by 5-8% by improving the melioration and irrigation condition of the land areas and recultivation of the lands left from agricultural circulation. Wide implementation of the circular economy in the system of the bioeconomy sector of Bukhara region will increase the production range of products with a high level of added value chain from biomass through the effective use of goods, secondary and non-standard products for production in the sector, increase the competitiveness of products and safely dispose of waste. ensures disposal. as a result, the loss and death of biomass will be reduced, and the income of product producers will increase, and new jobs will be created in the bioeconomy sector of the region.

In the "Development of the bioeconomy sector of Bukhara region in 2025-2030" strategy, which is being prepared, food insecurity and supply, ecology and biodiversity preservation in the organization of production, by-products produced in bioeconomy sectors, preparation of biogas and various biofuels from waste, such issues as the introduction of smart and other innovative technologies in the field will also find their solution. The preparation and implementation of this strategy in the province will ensure the stable development of bio-economic sectors in the future and make a turning point in the development of the sector.

References

1. Address of the President of the Republic of Uzbekistan Shavkat Mirziyoyev for 2023 <https://review.uz/uz/post/appeal-for-2023-of-uzbekistan-respublikasi-prezidenti-shavkat-mirziyoyev-full-text>
2. Global Bioeconomy Summit Communiqué, 2020//https://gbs2020.net/wp-content/uploads/2021/04/GBS-2020_Global-Bioeconomy-Policy-Report_IV_web-2.pdf
3. In-Depth Analysis on the Bioeconomy main stakeholders courses and Systems Joint Report-Overview (D1.1.) elaborated in the frame of the project "New Master's Degree Curricula for Sustainable Bioeconomy in Uzbekistan" (BioEcUz) No 619294-EPP- 1-2020-1-LV-EPPKA2-CBHE//JPhttps://uniwork.buxdu.uz/resurs/13349_2_BFBE1DCE54A4AA76072D35DE1D331EE1B06F5D4E.pdf
4. 2009 JupiterImages Corporation/Imagine Ltd. Corrigenda to OECD publications may be found online at: www.oecd.org/publishing/corrigenda. © OECD 2009
5. EU Bioeconomy Strategy Progress Report European Bioeconomy Policy: Stocktaking and future developments. Luxembourg: Publications Office of the European Union, 2022//<https://www.fediol.eu/data/KI0122230ENN.en.pdf>
6. Nordic Bioeconomy Program 15 Action Points for Sustainable Change© Nordic Council of Ministers 2018 Layout: Louise Jeppesen Print: Rosendahls Printed in Denmark// [https://norden.diva-portal.org/smash/get/diva2:1222743/FULLTEXT01 .pdf](https://norden.diva-portal.org/smash/get/diva2:1222743/FULLTEXT01.pdf)

7. National Bioeconomy Blueprint//https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/national_bioeconomy_blueprint_april_2012.pdf
8. Swedish Research and Innovation Strategy for a Bio-based Economy Report: R3:2012 ISBN 978-91-540-6068-9//
https://www.formas.se/download/18.462d60ec167c69393b91e60f/1549956092919/Strategy_Biobased_Economy_hela.pdf
9. The Bio-economy Strategy is an initiative of the Department of Science and Technology, South Africa.// https://www.gov.za/sites/default/files/gcis_document/201409/bioeconomy-strategya.pdf
10. Speech of the President of the Republic of Uzbekistan Shavkat Mirziyoyev at the ceremony dedicated to the Day of Agricultural Workers// <https://president.uz/oz/lists/view/1331>
11. For what purposes are the areas freed from grain used?// <https://yuz.uz/news/galladan-boshagan-maydonlardan-qaysi-maqsadlarda-foydalanilmoqda>
12. Information of the Bukhara Region State Statistics Department// <https://www.buxstat.uz/uz/>