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THEORY AND STRATEGY OF THE BIOECONOMY: THE CASE OF FINLAND

U.Z.Alimov, N.M.Omonov - "Tashkent institute of irrigation and agricultural mechanization engineers" National Research University

Abstract

The importance and necessity of bioeconomy in the economy is explained in the article. This article presents an analysis of Finland's promising directions in the bioeconomy. Forestry is the largest branch of the bioeconomy, and 9 billion euros worth of products are created in this sector annually. In addition, the main 7 directions in the development of bioeconomy in Finland were studied. The existing bioeconomy improvement mechanisms in Finland are a major priority for the development of this sector in the country. R&D funding mechanisms are implemented by the Business Support Organization of Finland and the Academy of Finland by providing financial support for research and development and helping bring innovative bioeconomy solutions to market.

Keywords: *strategy, economic growth, trend, gross domestic product.*

Introduction. Different regions and countries have different tariffs for bioeconomy. The emergence of a bioeconomy tariff in countries is influenced by the economic priorities of a particular country, biological resource base, technological potential, and regulatory approaches to the use of biotechnology. Institutionally, the European Commission defined the bioeconomy as a set of economic sectors that use biological resources such as renewable terrestrial and marine crops, forests, fish, animals, and microorganisms for food production (European Commission, 2012). According to the information given in the sources of the OECD organization, "the bioeconomy can be considered as a world where biotechnology contributes to a significant share of the economic output. The emerging bioeconomy includes three elements: the use of advanced knowledge of genes and complex cellular processes to develop new processes and products, the use of renewable biomass and efficient bioprocesses to support sustainable production, and the use of biotechnology knowledge and integration" (OECD The Bioeconomy to 2030, 2009). Finland has developed its bioeconomy for hundreds of years, particularly its forestry industry. Finland pays particular attention to sustainability in forest management, and this can be explained by the fact that Finnish forestry data shows that there is 50% more wood now than there was 50 years ago. According to the mechanism introduced in forestry management in Finland, four new tree saplings are planted for each cut down tree. The Finnish state aims to ensure the sustainable growth and development of the bioeconomy through a strong, stable, long-term policy. Forestry, which is considered the main direction of bioeconomy, is a historically priority area of Finland. Today, approximately 78% of Finland's area is covered by forests, and the forest industry generates an annual turnover of 20 billion euros and accounts for 27% of net exports.

Thanks to the focus on the bioeconomy in the country, the bioeconomy now accounts for 13% of the Finnish economy and employs more than 300,000 people. Many branches of the bioeconomy in the country are considered promising, and the government is currently paying great attention to their development (Fig. 1).

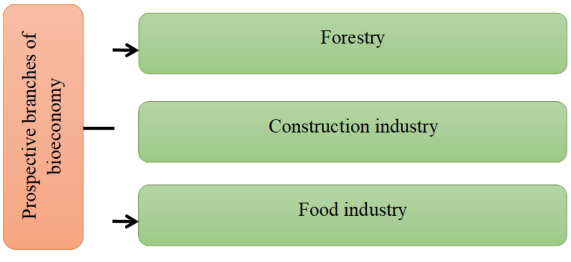


Figure 1. Prospective branches of the Finnish bioeconomy.

Forestry is considered the largest branch of the bioeconomy, and annual production of 9 billion euros is created in this branch. The construction sector, which is considered the second main sector, creates a value of 4.6 billion euros, and the food industry, which is considered one of the most important sectors of the country's bioeconomy, creates more than 4.3 billion euros. In addition, in the country's long-term plans, investments in the energy sector are expected to grow significantly, and it has been determined that it will be approximately 13% annuallyIn particular, Finland's national goal is to increase the share of biofuel in the transport fuel industry to 30 percent by 2030. Based on the available opportunities and the development trends of the economy, Finland has determined the priority areas of the bioeconomy, attracting investments in these areas and developing the networks of these areas as a priority task (Table 1).

Table 1

Priority directions in the development of the bioeconomy of Finland

	Directions	Assigned tasks
Priority directions of bioeconomy	Forestry and plant resources	It attaches great importance to the development of forestry and horticulture through sustainable management of forest resources. Focuses on new ways of using forest products and biomass, including bioenergy, biochemistry and new materials production
	Bioenergy	Finland has identified Bioenergy, especially the development of energy production from forest biomass, as an important direction. This is aimed at increasing the stability of energy supply and reducing climate change
	Food and agriculture	Promote sustainable food production and agriculture, including a focus on organic and local food products. Development of high efficiency and environmentally friendly agricultural methods through biotechnology and genetic research
	Chemistry and new materials	Development of new biochemistry and biobased materials, including bioplastics and other biobased products. This direction is aimed at creating sustainable alternatives to oil-based products
	Water resources and fisheries	It emphasizes the sustainable management of water resources and the development of fisheries, including aquaculture. This is an important branch of bioeconomy
	Research and innovation	It supports innovation and scientific research in the field of bioeconomy, thereby stimulating the development of new technologies and products.
	Education and skills development	Investing in education and training programs to prepare the professionals needed in the field of bioeconomy

Priorities mentioned table-1 are aimed at efficient and sustainable use of natural resources, economic renewal and environmental stability. The priorities for the development of Finland's bioeconomy include new ways of using forest products and biomass, including bioenergy, biochemistry and the production of new materials, increasing the stability of energy supply and reducing climate change, and high efficiency through biotechnology and genetic research, developing environmentally friendly agricultural methods,

creating sustainable alternatives to petroleum-based products, encouraging the development of new technologies and products, and investing in education and training programs to train the necessary professionals.

METHODS. When writing the article, the main concepts and terms were formed by analyzing the literature. In this, the analysis of existing scientific articles, books and reports on bieconomy was carried out. Moreover, in the analysis of institutional documents, mainly the analysis of documents related to bioeconomy was carried out using the data released by the European Commission and other international organizations. By examining the Finnish government's bioeconomy policy documents and strategic plans, the current state of public policy was identified.

RESULTS. The development of bioeconomy in Finland is explained not only by historically strong opportunities, but also by the establishment of mechanisms created by the state. The country has implemented several mechanisms to improve the bioeconomy in line with its strategic goals of sustainability, innovation and economic growth (Figure 2).

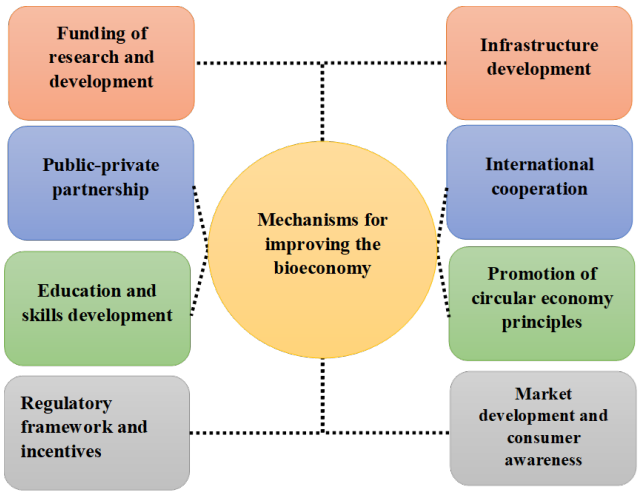


Figure 2. Mechanisms for improving the Finnish bioeconomy.

The mechanisms introduced in Finland aim to create a sustainable, innovative and competitive bioeconomy that contributes to the protection of the environment and the well-being of society while developing the country's economy. R&D funding mechanisms are implemented by the Business Support Organization of Finland and the Academy of Finland by providing financial support for R&D and bringing innovative bioeconomy solutions to market. The main focus is to invest in research and development related to the bioeconomy, including scientific research, technology development, and financing of innovative projects that explore new ways of using biological resources.

In the public-private partnership mechanism, the government places great emphasis on encouraging cooperation between the public sector, academic institutions and private companies to support innovation and development in the bioeconomy. These partnerships are often focused on joint research projects, development of new technologies, and commercialization of bio-based products and services.

The demand for skilled labor for the growth of the bioeconomy is realized through the mechanism of education and skills development. In doing so, Finland envisages the inclusion of bioeconomy topics in educational curricula at various levels, from primary education to higher education and vocational education programs, to ensure that the workforce is well equipped with the necessary knowledge and skills. provides.

The Finnish government has been implementing supportive measures for the bioeconomy, including policies and incentives that promote a sustainable economy, innovation and the use of bio-based materials, with the help of a regulatory framework and an incentive mechanism. In this case, tax incentives to support start-ups in the bioeconomy sector, subsidies to ensure a stable economy will be implemented.

Finland participates in research and innovation programs funded by the European Union through the system established in International Cooperation, cooperates with other countries on bioeconomy projects, and participates in international forums and networks related to bioeconomy and sustainability.

The growth of the bioeconomy in Finland, including the development of biorefineries, research facilities, and logistics networks that allow efficient production, processing, and distribution of bio-based products, attracting investments in infrastructure, scaling up the infrastructure development mechanism, will be implemented.

In the country, the principles of the circular economy are included in the bioeconomy strategy, aimed at reducing waste, increasing resource efficiency, and creating closed systems where materials are reused and recycled. Promoting the principles of the circular economy meant support through political influence, financing of circular economy projects, and public awareness campaigns.

Market development and consumer awareness of the benefits of bio-based products through marketing research, labeling schemes for bio-based products and public education campaigns are among the main mechanisms created.

CONCLUSION. Finland's bioeconomy is developing based on the principles of sustainability, innovation and economic growth, relying on its natural resources and historical development. Within the European Commission's definition of bioeconomy, this country has developed its bioeconomy mainly through forestry, and today forestry is the major part of its bioeconomy. Finland's bioeconomy strategies and priorities can be characterized by the following main aspects:

-Forestry and sustainable management of resources: Finland attaches great importance to the sustainable management and development of forest resources. It ensures reforestation by planting four new saplings for every cut tree, which has led to an increase in forest area and timber resources.

- **Bioenergy and new technologies:** Bioenergy seeks to increase sustainable energy supply and reduce climate change, particularly by developing energy production from forest biomass.

- **Food and Agriculture:** The aim is to develop sustainable food production and agriculture, as well as to develop environmentally friendly methods by focusing on organic and local food products.

- **Chemistry and new materials:** Development of new biochemistry and bio-based materials, including bioplastics and other sustainable alternatives, thereby creating sustainable alternatives to petroleum-based products.

- **Water resources and fisheries:** Emphasis on sustainable management of water resources and development of fisheries, including aquaculture.

- **Research and innovation:** Development of new technologies and products by supporting innovation and scientific research in the field of bioeconomy.

- **Education and skills development:** Investing in education and training programs to prepare needed professionals.

Finland's success in developing the bioeconomy is also explained by the mechanisms created by the state. Mechanisms such as financing of scientific research and development, public-private partnership, training of qualified workforce, supporting procedures, international cooperation, investments in infrastructure, introduction of circular economy principles and marketing research occupy the main place in this.

Thus, Finland's bioeconomy serves the sustainable and innovative development of the country's economy. This, in turn, not only brings economic benefits, but also contributes to the protection of the environment and the well-being of society.

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