

Bioeconomy and ecobiopolitics in the natural resources management system

Bioeconomía y ecobiopolítica en el sistema de gestión de recursos naturales

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Content

- [1. Introduction](#)
 - [2. Methods and design of work](#)
 - [3. Concept of bioeconomy](#)
 - [4. Concept of ecobiopolitics](#)
 - [5. Relationship between bioeconomy and ecobiopolitics](#)
 - [6. Conclusions](#)
- [Acknowledgements](#)
- [Bibliographic references](#)

ABSTRACT:

The article is devoted to the role of bioeconomy and ecobiopolitics in the environmental management system. It shows that bioeconomy is related to the use of the entire range of biological resources, while the scope of the use of biological systems is confined to the levels of organization of living matter, starting with cells and ending with the biosphere. In the framework of bioeconomy, it is important to observe the principle of synchronous reproduction and use of biological resources, which is considered the most optimal balance model. Ecobiopolitics is the system of public regulation of bioeconomy, featured by conventions and agreements, laws, codes, and other regulatory documents. Bioeconomy must comply with the norms of ecobiopolitics, which forms the framework for the possible use of biological resources.

Key words bioeconomy, ecobiopolitics, natural resources, environmental management, bioethics.

RESUMEN:

El artículo está dedicado al papel de la bioeconomía y la ecobiopolítica en el sistema de gestión ambiental. Se muestra que la bioeconomía está relacionada con el uso de todo el espectro de los recursos biológicos, y la cobertura de las capacidades de uso de los sistemas biológicos se asocia con el nivel de organización de la materia viva, empezando desde lo molecular y terminando con la biosfera. En el contexto de la bioeconomía, es importante respetar el principio de la sincronización de la reproducción y el uso de los recursos biológicos, lo cual es el modelo de equilibrio más óptimo. La ecobiopolítica es un sistema de regulación estatal de la bioeconomía que se manifiesta en las convenciones de los países desarrollados y los acuerdos, leyes, códigos y otros documentos normativos. La bioeconomía debe obedecer a las normas de la ecobiopolítica, la cual forma el marco de la posible utilización de los recursos biológicos.

Palabras clave bioeconomía, ecobiopolítica, recursos naturales, gestión ambiental, bioética.

1. Introduction

The modern economy presupposes the full and integrated use of diverse resources of animal and vegetable origin, which creates the basis for a profitable and environmentally oriented approach, suggesting a system of deep processing not only of critical raw materials, but also of recyclables, classified as production and consumption waste. It is believed that the main consumers of a wide range of animal and vegetable raw materials are food and light industry enterprises focused on the use of innovative biotechnological schemes that ensure full processing up to the level of a product with specified properties.

The recycling strategy related to the most complete processing of recyclables, is considered one of the key directions of economic growth for the agricultural sector. This is accounted for by discovery of the reserve use value of agricultural and processing waste.

The reserve usability becomes evident as a result of various technological manipulations with recyclables, enabling the use of waste, considered low-quality in the main production system, for obtaining a full-fledged product carrying the entire range of consumer properties, which makes it competitive in the market. It should be noted that environmental management, as well as industrial processing of biogenic waste, are only one of the elements of bioeconomy, which is governed by ecobiopolitics.

The purpose of this work is to study and outline the key concepts of the resource conservation system, and such rather new terms as "bioeconomy" and "ecobiopolitics" are among them. We believe that the explanation of these concepts will allow us to form an understanding and generate the role of the terms having an interdisciplinary significance, as well as to see the interrelationship between various spheres of science and practical activity. In our opinion, such cooperation of scientific disciplines is a challenge of the time, when interaction of scientists from different scientific fields is necessary to solve an important environmental problem of national economic significance.

It is obvious that the theoretical significance of the work comes to the fore, ensuring epistemic perception of the definitions under consideration. It should be noted that the problem of bioeconomy and ecobiopolitics was thoroughly investigated in a number of studies (Mohammadian, 2003, Kirpichnikov, Kanygin 2012; Bobylev et al., 2014; Lyzhin, 2014, 2016; Boltaevskiy, Pryadko, 2016; Lavrova, Sharova, 2016; Nagoev, Shaduyeva, 2016). In this context, the work contains an author's view of this problem, which is supported by the opinions given in the literary sources.

2. Methods and design of work

The work is based on a systematic approach, suggesting a wide coverage of various aspects of bioeconomy and ecobiopolitics. The article contains a number of references to literary sources, which made it possible to compare them. At the same time, the author sets out his own interpretation of the concepts under consideration based on the literature data. Therein lies the monographic method employed here. Based on the methods of analysis, synthesis and comparison, tabular and illustrative material has been created, which helps make the presentation more explicit. The composition of the work includes the following sections: (1) the concept of bioeconomy; (2) the concept of ecobiopolitics; (3) the relationship between bioeconomy and ecobiopolitics; (4) the conclusion, where an inference on the work is contained.

3. Concept of bioeconomy

In our view, bioeconomy does not only allow us to see the scientific "symbiosis" of biology and economy, but also to consider the role of economy in the system of biological knowledge within the framework of environmental management in all its manifestations and at all levels. This term is in its nature similar to the term "green economy", but for all the similarity between

these concepts, it is possible to distinguish certain features inherent in bioeconomy. We'd like to clarify right from the beginning, that there exists a separate direction of bioeconomy, addressing the problem of behavior and interaction between individuals with account for economic approaches, neuroeconomics, consumer behavior, questions of the evolutionary theory of games, etc. (Mohammadian, 2000), but we do not touch upon this aspect of bioeconomy in this paper. We have studied that subsystem of bioeconomy, which verges on the issue of environmental management. First, it was proposed in the fishery system for calculating the initial biomass, catches, stocks, the number of units of navigational equipment and other parameters (Seijo et al., 1998).

We suppose that bioeconomy is related to the integrated use and evaluation of the economic efficiency of living systems at all levels of the organization of living matter, starting with cells and ending with the biosphere (Table 1).

Table 1
Relationship between levels of living matter and bioeconomy

Levels of organization of living matter	Bioeconomic examples with real or potential prospects for commercialization, requiring funding
Molecular	(1) Genetically modified organisms (plants and animals) used as food products; (2) commercial cloning of bacteria, plants and animals; (3) genetic engineering for the needs of medicine
Cellular	(1) Cellular engineering in embryology and breeding, enabling control over embryonic material, predetermining, for example, the sex of offspring of highly productive farm animals; (2) in vitro fertilization as one of the commercial human reproductive technologies
Organo-tissular	(1) Tissue engineering in medical practice; (2) transplantology; (3) application of useful organs and tissues of animals in various industries for production of food and non-food products; (4) effective use of secondary animal and plant raw materials in the system of recycling technologies; (5) use of organs and tissues as initial models in biomimetics
Organismic	(1) Live animals and plants as objects of sale for the needs of the agro-industrial sector; (2) commercial demonstration of animals and plants in zoos, aquariums, dolphinariums, circuses, botanical gardens; (3) purchase and sale of live animals as pets and for human entertainment (for example, horse racing, etc.); (4) laboratory animals for scientific and medical purposes; (5) game animals and raw materials obtained from them
Population-specific	Biodiversity is an indispensable natural factor that provides gene pools of various plant and animal species, as well as a wide range of products based on plant and animal raw materials
Biogeocenosis	(1) National parks designated as recreational and tourist sites; (2) agrobiocenoses as part of anthropogenic agro-industrial infrastructure; (3) park complexes in urban environment
Biospheric	(1) Transboundary movement of waste as part of anthropogenic

human impact on the natural environment; (2) uncontrolled tropical deforestation leading to a greenhouse effect; (3) systematic allocation of financial resources by developed countries for solving global problems of mankind

The information given shows that bioeconomy is applied for all levels of living matter — from genetically modified organisms, which presuppose the original DNA editing by genetic engineering methods, and ending with the global problems of mankind that have a biological or ecological basis. It is important to use a complex of the most innovative systems for treatment, processing and distribution of biological products. Technological lines and logistic technologies should be rational in nature and allow for the possibility of rapid consumption, which is important for ensuring a high quality of products. Delay in distribution, as well as excessive storage of goods of this assortment range have only a negative effect on their quality and lead to significant costs and losses (Kiladze, 2017).

The two interrelated processes lie at the heart of bioeconomy — reproduction of biological resources and their use. Reproduction can be natural due to natural restoration to the level of the initial biomass, and anthropogenic, when people create conditions for restoration of biological resources. The rate of anthropogenic reproduction is often much more intense than that of the natural type. The use of biological resources is necessary to meet a variety of human needs, ranging from physiological (food) and ending with intellectual (scientific research) and spiritual (symbolic and religious significance) needs. Physiological needs of humans are fundamental and crucial. In the conditions of constant population growth, a shortage of natural resources arises. This encourages countries to carry out export and import transactions. The least developed countries live below the poverty line, with people lacking not only food, but also drinking water. All this leads to hunger, physical exhaustion and imminent death of people.

Reproduction and use of natural resources in the system of bioeconomy should be synchronous; it is important to manage these processes and prevent a shortage of resources on the one hand, and overproduction on the other. This is the most rational model of the production balance, to be sought for by bioeconomy of any state. Obviously, such key concepts as profit, prime cost, price are also important in this branch of the economy, because it is only through these economic parameters that biological goods become profitable and demanded for consumption or exploitation; at the same time, due account should be given to requirements of ecobiopolitics.

4. Concept of ecobiopolitics

Ecobiopolitics is a system of public regulation in the field of environmental safety and rational use of natural resources, reflected in regulations that can be adopted not only at the national level, but also in the system of private international law, which is embodied in the form of conventions and agreements. Scaling of statutory regulation of ecobiopolitics is given in Table 2.

Table 2
System of legal provisions in the field of ecobiopolitics

Level	Implementation
International	Private international law in the form of conventions and agreements.
Regional	Legal provisions in the system of the European Union, the Eurasian Economic Union and other national unions

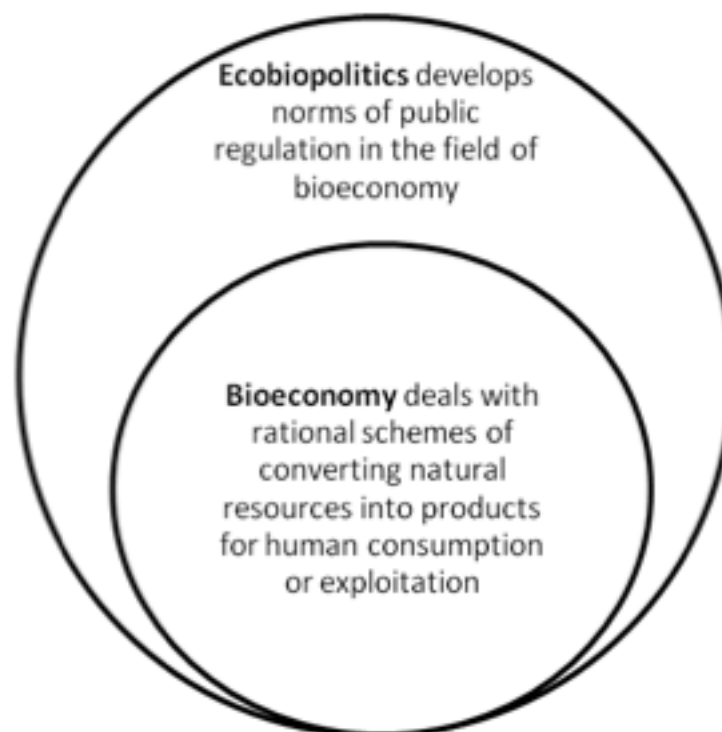
National	Constitutions of states, laws, codes, government decrees, decrees of individual ministries and departments
Local	Local laws and regulations (including at the municipal level)
Internal	Internal regulations in the system of individual economic entities (enterprises, factories, plants, companies)

In the system of ecobiopolitics, international and national standards, as well as technical regulations that govern normative and technical aspects of the natural resources use, can be of a definite importance. Besides, it is crucial to observe bioethical standards, which can be presented in the form of recommendations, guidelines, government programs and other regulatory documentation, including international ones.

5. Relationship between bioeconomy and ecobiopolitics

Comparing bioeconomy and ecobiopolitics, it is important to emphasize that bioeconomy must be confined by the accepted state and interstate norms of ecobiopolitics. It follows, that ecobiopolitics is a system for regulation of bioeconomy, allowing it to develop within the acceptable limits (Figure 1). In this regard, ecobiopolitics should anticipate various activities in the field of bioeconomy, including its adverse effects associated with overexploitation of natural resources or violation of the bioethical principles (Mishatkina, Melnov, 2016).

Figure 1
Relationship between bioeconomy and ecobiopolitics



6. Conclusions

Bioeconomy is now a growing sector of industry, agriculture, aquaculture, biomedicine, with a high level of liquidity and profitability. That is why it is very important to built bioeconomic activity on the rules distinguished by transparency and legality, which should be set by ecobiopolitics. We hope that the presented analysis of bioeconomy and ecobiopolitics will allow developing a certain strategy and ideological paradigm based on the principles of rational and careful attitude to natural resources.

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[Index]

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