Ensuring Environmental Safety of the Arctic Region: The Case of Genomic Technologies

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Abstract. The Arctic is a unique macro-region of national and global significance. The vulnerability of its ecosystems predetermines the uniqueness of the region. The Arctic is a territory with significant natural and biological resources, including hydrocarbons. The Arctic is also a place of traditional residence and economic activity of indigenous people. Climate change can irreversibly alter the Arctic ecosystems. Therefore, the development of legal mechanisms for environmental protection of the Arctic is a priority. Currently, biotechnologies are becoming increasingly important. Using genomic technologies allows one to solve Arctic-specific problems, such as providing food security. However, the application of genomic technologies to environmental safety of the Arctic has not yet received proper research in Russia. The documents on strategic planning for the Arctic development indicate that the application of genomic technologies is, currently, environmentally inadequate. This is a consequence of a current lack of the Arctic environmental framework on applying genomic technologies. The principles of the “green” economy are integral to ensuring the environmental safety of the Arctic. Therefore, this paper aims to formulate the principles of environmental safety of the Arctic region in applying genomic technologies. The author employed comparative-legal and formal-logical methods to analyze the current political, legal, and regulatory acts on the development and environmental safety of the Arctic. As a result of the study, the authors formed the principles of ensuring the environmental security of the Arctic region in the implementation of genomic technologies. These principles may become the foundation for the ecological-legal paradigm of the Arctic.

Keywords: Arctic region · Environmental safety · Genomic technologies · Principles

1. Introduction

The current climatic conditions allow humanity to exploit the territories that were previously untouched. One of these territories is the Arctic. Several environmental problems already plague this macroregion: accumulated environmental damage, loss of biodiversity, and pollution with mercury and other heavy metals. An increase in anthropogenic load will lead to the environmental deterioration of the Arctic. Therefore, it is essential to assess the possible environmental and legal consequences of economic activities and form a set of measures that ensure the environmental, biological, and genetic security of the Arctic. Presently, one of the least studied economic activities is the use of genomic technologies, particularly in agriculture. Neither strategic planning documents nor environmental regulatory legal acts do not include provisions on the environmental protection measures and ensuring the environmental safety of the Arctic region in the application of genomic technologies. Despite the amount of secondary literature on the environmental [7] and biological security [31] of the Arctic, there is no scientifically-substantiated framework of legal measures for ensuring the environmental security of the Arctic region.
in various economic activities, including the application of genomic technologies. The principles of environmental security provision are also not defined. These principles are an integral part of environmental security; they must form the basis of legal means of environmental security provision.

2. Materials and Methods
In this study, the author employed:

1. Formal-logical analysis of the documents on the development of the Arctic and the environmental protection in the Russian Federation;
2. System-structural analysis method;
3. Judicial interpretation method;
4. Comparative-legal analysis of Russian and foreign legal practices;
5. Judicial modeling method.

These methods allowed the author to form the principles of environmental safety of the Arctic in the application of genomic technologies.

3. Results and discussion
Environmental safety of the Arctic is becoming a top priority in the current conditions of increasing anthropogenic stress. The legal mechanism for ensuring environmental safety in Russia is represented by several regulatory legal acts, including the Constitution of the Russian Federation [19], the Federal Law “On Environmental Protection” (January 10, 2002 No. 7-FZ) [20], the Decree of the President of the Russian Federation “On the Strategy of Environmental Safety of the Russian Federation up to 2025” (April 19, 2017 No. 176) [17]. The environmental protection of the Arctic must be represented by additional prohibitions and restrictions on anthropogenic activities. These measures are necessary due to the unique ecological and legal properties of the Arctic — its supranational significance, slow natural processes, reduced absorption capacity of the natural objects, and climate change [3].

According to the UN Environment Program, climate change is the leading global environmental problem in the Arctic [14]. Climate change causes ice cap melting, the disappearance of Arctic animal habitat, increased activity of pests and parasites, and an increase in fish migration from the southern seas to the northern seas [1].

The experience of subarctic states indicates that that genomic technologies allow solving some of the Arctic region problems. With the help of genomic technologies, new breeds of reindeer, resistant to negative environmental changes, were recently bred. Positive foreign practices can be taken into account in Russia. Nevertheless, the implementation of genomic technologies raises several environmental and legal questions, particularly on its risks and consequences, the measures of environmental safety provision, etc. However, in modern secondary literature, the legal side of the environmental protection of the Arctic is severely under-researched [29]. The practical legal regulations on the environmental security of the Arctic in genomic technologies application is also severely lacking. Therefore, forming the legal framework on this issue is a top priority.

Currently, the environmental safety of the Arctic is seen as a part of the regional socio-economic development. Therefore, there are no separate political-legal and legal-regulatory acts governing the environmental safety of the Arctic. However, several strategic planning documents for the Arctic zone contain ecological and legal requirements for anthropogenic activities.

The Presidential decree on state policy [18] poses the environmental protection of the Arctic as the main goal and the central direction of Far North development. However, in this document, genomic technologies are not accounted for.

In the State Program of the Russian Federation “Social and Economic Development of the Arctic Zone of the Russian Federation” [10], environmental protection is linked to the implementation of the State Program “Environmental Protection” [9]. There are plans to develop ecological monitoring and
eliminate the accumulated past environmental damage. The natural resources of the Arctic (hydrocarbons, mineral resources (ferrous, non-ferrous, rare, and precious metals) and its land and water biological resources are to be included in the economic circulation.

The environmental standards in the strategic planning documents on the Arctic region are inadequate. They need to be brought in line with strategic planning documents on ecological protection and ecological safety [30].

In secondary literature, the need for federal laws on Arctic development has been repeatedly expressed. One of the bills was proposed by the Ministry of Regional Development of Russia in 2013. The second chapter of this draft law aims to organize the rational use of natural resources and protect the environment. However, the regulation is too superficial and includes only three legal protection measures – environmental impact assessment, state ecological expertise, and municipal environmental control.

In 2017, the Ministry of Economic Development of Russia also presented a draft federal law “On the development of the Arctic zone of the Russian Federation” [12]. This bill did not contain environmental standards. Therefore, we believe that the federal law “On the Arctic ecological zone of the Russian Federation” should be the central regulatory legal act in the field of environmental protection and environmental safety of the Arctic region, including the application of genomic technologies [30, 31]. The principles of environmental security are an integral part of the corresponding legal framework. These principles will be able to ensure the environmental protection of the Arctic on an integrated and systematic basis.

The first principle is the presumption of the potential environmental hazard of the planned activities. This is a basic fundamental measure with significant value in the Arctic environment. It is implemented in environmental legislation through several preventive procedures, such as state environmental expertise, state environmental supervision, etc.

The second principle is the obligatory nature of the strategic environmental assessment [SEA]. Not only the planned activities must be assessed, but also those already implemented [2]. SEA is also essential in the international aspect, which is of paramount importance for the Arctic [13].

International documents consider SEA to be a part of sustainable development and a mechanism for implementing the Millennium Development Goals. Internationally, SEA is regulated by the “Convention on EIA in a transboundary aspect” [24] and Directive 2001/42/EC [6].

In Russia, political and legal acts on rational environmental management, the implementation of certain economic activities, and environmental protection also presuppose the introduction of SEA. In particular, these acts include the Presidential Decree “On the strategy of environmental safety of the Russian Federation until 2025” (April 19, 2017 No. 176) [17], and the “Fundamentals of state policy in the field of environmental development of the Russian Federation up to 2030” (April 30, 2012) [16]. However, neither these political-legal acts nor the strategic planning documents on the Arctic development account for SEA in the Arctic economic activities, which significantly reduces the impact of environmental preventative measures. But these environmental legal instruments allow one to assess the possible risks of anthropogenic activities and minimize their negative consequence. Evidently, the issue of introducing SEA into Russian practice is relevant. It will ensure that environmental requirements are considered when the government and local authorities try to approve the strategic plans and programs on potentially harmful economic activities.

The third principle is the precautionary principle. It stems from several international documents: the World Charter for Nature [22], Rio Declaration [25], Cartagena Protocol on Biosafety [27], etc.

This principle means that the implementation of any anthropogenic activity should be preceded by a profound scientific analysis of possible environmental risks and consequences. The benefits of these activities must significantly outweigh their adverse effects [21]. This allows scientists to discuss the need to use the conservation type of environmental protection in the Arctic.

This principle is essential for national and international legislation, as well as legislation of
integrative communities. This principle is of particular importance for the Arctic, given its ecosystem uniqueness and the global nature of environmental problems. The application of the principle allows one to ensure that environmental requirements are taken into account in the Arctic industrial development.

The fourth principle is considering environmental factors in the strategic planning of regional development. Implementing this principle requires bringing the strategic planning documents of the Arctic region in line with ecological legal acts, including those of strategic importance.

The fifth principle is ensuring the right of indigenous peoples to their traditional way of life and economic activity. This right is implemented via various legal mechanisms.

The right to traditional use of natural resources is recognized by legislative and judicial practice as an “inalienable right of indigenous peoples” [15].

The International Labour Organization guarantees the right of indigenous and tribal people to their traditional economic activities [23]. The UN “Convention on Biological Diversity” also dwells on the preservation and support of the traditional knowledge, innovations, and practices of indigenous people.

Currently, the strategic task of Russia is “the development and modernization of traditional economic activities,” the implementation of which should not worsen the health of indigenous peoples but improve it [11]. This is possible by implementing several measures, including state support for reindeer husbandry and the selective improvement of reindeer breeds. However, when developing the Arctic, it is necessary to assess the cultural, environmental, and social consequences of projects located in places of indigenous residence and traditional economic activities. Indigenous people also require help in adapting to the environmental, economic, and social consequences of climate change.

The sixth principle is biosecurity. The doctrine of environmental law understands biosafety as “prevention of damage and the achievement of protection of a person, society, and state from biological threats” [5]. The use of genomic technologies can be dangerous for the genome of plants, animals, and humans, first of all, for indigenous peoples. Therefore, “biological safety is the preservation by living organisms of their biological essence, biological quality, system-forming connections and features, and prevention of large-scale loss of biological value” [28, 29].

Genetic safety is an integral part of biosafety. Regarding the Arctic, threats to genetic security are primarily seen in the penetration of “alien biosystems” into the Arctic region, especially genetically engineered organisms. “The goal of genetic engineering is the introduction into the recipient cell of one or several (usually foreign) genes or the creation of new regulatory links in the genome without changing the species of the recipient. Genomic engineering aims at deeper intervention into the genome, up to the creation of a new species” [4]. Given that biotechnology has applications in agriculture, the risks of consuming new varieties of plant and animal products are “risks to human health associated with food consumption or exposure to agricultural products; impact on the life and health of plants and animals; environmental impacts such as potentially harmful effects on the conservation and sustainable use of biological diversity, including genetic resources for food and agriculture” [4].

Therefore, any application of genetic and genomic engineering methods in the Arctic requires preliminary scientific assessment and scientific experiments to prevent changes in the genome of humans, plants, and animals.

The seventh principle is the imperative of international environmental legislation. This principle is essential for the Arctic since it is a territory with international significance. However, many international documents are soft law, i.e., not legally binding. Therefore, these environment protection norms have a sort of declarative nature [1]. Therefore, it is necessary to change the conceptual vector of international legal cooperation and ensure the imperative of global legal and ecological requirements on the Arctic.

4. Conclusion
The author formulated the principles of environmental safety of the Arctic in the implementation of genomic technologies. These principles form the basis of ecological and legal framework on the Arctic.
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