

Importance and Problems of Landscape Diversity Conservation in the Environmental Policy of Poorly Developed Regions

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Abstract. The environmental strategy for regional development is implemented through regional environmental programs. Their list of indicators that track the effectiveness of planned tasks shows that the most important regional aspects are not always properly reflected. The specificity of spatial and temporal trends in the development of regions, the peculiarities of territorial changes in geosystems, and the dynamics of the ratio of disturbed and undisturbed territories are of particular importance in highlighting the tasks in the context of the application of particular indicators. In the context of increased economic activity in the Russian Far East, facilitated by the policy of improving priority social and economic development areas, the regions identify their own tasks for sustainable development. From the perspective of the geographical approach, the content of the concept of landscape diversity, contained in the environmental program of Khabarovsk Territory to reflect spatial changes, is briefly presented. Landscapes as integral systems are considered from the point of view of their positions in the system of taxa of the regional hierarchy. The significance of "landscape diversity conservation" criterion for solving the same problem as a priority for this territory has been shown. The necessity of its application in the region has been considered due to the concentration of natural complexes of a high hierarchical rank, their significant share within the region, the uniqueness and at the same time a high degree of landscape vulnerability to anthropogenic impact due to increased economic activity, the imperfection of the PA network etc.

1. Introduction

The ecological strategy for the development of regions (being developed in all constituent entities of Russia with the aim of ensuring an ecologically balanced development of territories) is implemented through targeted ecological programs. These documents accumulate the strategic and tactical tasks of the regional environmental policy (REP), and the effectiveness of its implementation is monitored according to the adopted and approved indicators. A significant achievement of the program-targeted mechanism for solving the set tasks is the use of indicators, which, despite their selectivity, are designed to explain the socio-economic meaning of the measures taken and reflect the trends in the improvement of the ecological situation.



Of course, the tasks and the list of indicators in the programs should be adjusted when trends and problems of territorial development change, and also to a certain extent individualized for each region, depending on its specifics. So, for the Russian Far East (RFE), the need to develop and apply regional indicators of the REP is determined by the following reasons.

First, the ambitious goals of strategic planning, which are outlined in the development plans for the region until 2025 and adjusted until 2035.

Second, the strengthening of economic activity through the creation of territories of advanced socio-economic development (TASED).

Third, by reflecting the specifics of regional development in environmental requirements in the context of global trends (for example, the green growth model or a green economy model as an improved model of sustainable development).

At the same time, when forming the content of environmental programs, developers are governed by:

- general guidelines developed by higher authorities designed to ensure the validity of decisions made by summarizing quantitative assessment and simplification;
- materials of official statistics available in the region, unified for all country's regions;
- cost savings in obtaining initial information;
- the need to support the development of those sectors of the economy that determine the specialization of the region;
- the use of environmental indicators that do not contradict economic development and do not reduce its pace.

As a result, the emerging concept of regional environmental specificity depends, first of all, on the economic needs of society and is focused on optimizing the operation of resource industries. One of the significant shortcomings of the programs is the lack of areal indicators characterizing territorial changes. These include the ratio of the area of disturbed and undisturbed territories, because it is this indicator that is proposed in the system of territories as being the most important for sustainable development.

Through this relationship natural diversity can be considered as diversity in all forms of its manifestation (landscape, biological, geodiversity). It is an important property of objects, revealing their activity, combination and concentration of resources [1], the quality and number of locations, the specifics of functions, the lateral and vertical connections of geosystems, the quality of the environment, which creates conditions for ensuring life and economic activity. To reflect this property, it is necessary to include the “conservation of landscape diversity” criterion in the regional system in addition to the “conservation of biological diversity” indicator already in use.

Moreover, in modern conditions “the only way to reliably conserve biodiversity is to conserve significant areas in each biome in an intact state. This means a transition from the species principle of biodiversity conservation, based on the description and conservation of individual species, to the ecosystem-biosphere one, based on the conservation of biogeocenoses”. [2, p. 7]. This thesis calls for a new assessment of not only the role of geosystems or landscapes to conserve the richness of biological species, but also the variety of natural complexes that have their own significance in spatial organization, based on the whole range of functions they perform.

2. Materials and Methods

The study was based upon the regulatory legal documents of the Government of Khabarovsk Territory and other constituent entities of the Russian Federation, related to issues of environmental policy, presented in the public domain. In addition, regulatory documents that regulate economic activities in the field of environmental protection and determine the environmental indicators of the development of a region's territory were used. To substantiate the significance of the indicator “conservation of landscape diversity” in the ecological programs of poorly developed territories, the methods of cartographic analysis of landscape maps of Khabarovsk Territory and specially protected natural areas were used. The study also used the methods of expert assessments, statistical and bibliometric analysis,

generalization and systematization.

3. Results and Discussion

In geographical studies, landscape diversity (LD) is usually understood as the number and frequency of occurrence of natural-territorial complexes within a region, which are a reflection of the structural and genetic heterogeneity of the territory [3].

However, in the practical guidelines of the Russia's regions that determine the conservation of the natural environment, the approach, reflecting the use of the term LD only from the standpoint of the spatial distribution of protected areas (PA), still prevails.

In the context of environmental programs as documents adopted for implementation, the conservation of LD should be considered as a measure of conservation of the entire variety of natural and natural-anthropogenic systems that have value as a natural and natural-cultural heritage. The substantiation of key tasks for a territory and the use of certain indicators in regional environmental programs that reflect the effectiveness of their implementation largely depend on the level of economic development, the stage of territory's development and other conditions. So, for the northern and eastern regions of the country, which are distinguished by poor development (10-30% of the area) and a resource-oriented structure of the economy, the most important problem is the conservation of the most valuable resource and environmental natural complexes in all their diversity. This is a task not only at the regional and national levels, but also at the international level. In order to restore the disturbed biotic regulation in the biosphere, according to a rough estimate, the area of natural systems on average should not be less than 50% of the land area, with an increase trend in the latitudinal direction from the tropics to polar landscapes [2]. In this regard, the indisputable ecological competitive advantages of the FER, in terms of the ability to maintain the life-supporting functions of the biosphere, are obvious. In addition, the need to preserve LD here is associated with:

- concentration of natural complexes of high hierarchical rank (the level of physical-geographical countries and provinces) in a specific territory, their significant share in the area of a particular region, uniqueness, etc.;
- accounting for the ecosystem services provided by landscapes (natural resource, environment forming and environment protecting) in the environmental policy;
- the possibility of maintaining ecological balance in a territory under conditions of intensified economic activity;
- high vulnerability of landscapes to anthropogenic impact;
- the idea of landscapes as integral systems (geosystems), considered from the standpoint of their positions in the regional and national natural-economic-social complex;
- annual reduction in the area of undisturbed territories;
- imperfection of the PA network, etc.

Modern problems are formed, on the one hand, by the conditions of the limited resource base of the planet for economic growth and, on the other hand, by the vulnerability of geosystems, which increasingly limits development opportunities. This situation forces to reconsider the attitude towards natural complexes, their diversity and conservation from the standpoint of the spatial relationship of land for their optimal functioning.

Let us consider the situation with the LD conservation in Khabarovsk Territory. Strategic planning here is carried out on the basis of the regional regulation – the state program “Environmental Protection and Environmental Safety in Khabarovsk Territory”. Its goal was to improve the ecological situation in the region. The environmental program, oriented towards 2020, included the following tasks: to reduce the negative impact on the environment, to conserve landscape and biological diversity and to form the public ecological culture. However, neither the content of the program, nor its indicators reflected how to carry out the protection of landscapes, nor the essence of the LD. The latter was associated with the part of the area of Khabarovsk Territory occupied by SPNA of all levels. This misconception testifies to the use of the term “landscape diversity” without filling it with meaningful content, not only in practical terms, but also

theoretically. As a result, it should be noted that the task turned out to be impossible. Therefore, in the new program, aimed at 2025, the task of conserving landscape diversity is no longer highlighted, despite its relevance for poorly developed territories.

The main issues associated with the solution to this problem can be identified as follows:

- 1 – lack of scientific definition of the term “landscape diversity” in the previous program;
- 2 – insufficient comprehensibility of the significance of the indicator for understanding by the parties engaged in the economic development of a territory;
- 3 – misunderstanding of the value of natural capital in meeting the adaptive resource needs of the people (clean water, clean air), providing ecosystem services not only to residents of the region, but also to neighboring countries, using the potential of attractive features of landscapes, etc.;
- 4 – difficulties in obtaining initial data for starting observations and subsequent monitoring;
- 5 – professional unpreparedness of the persons in charge for the development of policy within the framework of this set of indicators, given that it is the regional administrations that “are the main managers of the set of indicators” [4, p. 28] in environmental programs;
- 6 – cost of obtaining primary (initial) information;
- 7 – need for geoinformation and cartographic support in reflecting the dynamics and trends of this criterion, etc.

The problems listed above explain the fact that this task is difficult to perform. Therefore, out of all the regions of the Far Eastern Federal District, it was reflected only in the environmental program of Khabarovsk Territory, despite the need to formulate and solve it in each one.

The significance of this indicator in regional environmental programs of poorly developed territories is more than obvious.

An analysis of the landscape diversity of a territory for the purposes of the REP has a number of additional advantages:

- providing the basis for public administration in territorial planning in the context of maintaining ecological balance in economic development;
- enabling to compare the indicators of different regions of the country in accordance with the level of territorial administration (national – regional – municipal);
- identifying the ratio of disturbed and undisturbed territories, the dynamics of changes;
- ensuring the adaptation of nature management to regional peculiarities by taking into account the natural resource, economic, cultural and historical specifics;
- expanding knowledge about the landscape structure of poorly studied and developed territories;
- forming the image of the uniqueness and wealth of the region among the population for educational and upbringing purposes;
- increasing the importance of the natural wealth of the territory at the international level;
- having an interpretation in the form of quantitative indicators that allow one to track the dynamics of changes, etc.

In Khabarovsk Territory, more than 60% of the territory is undisturbed or slightly disturbed landscapes. This economic entity, one of three in the Russian Federation (after Yakutia and Krasnoyarsk Territory), is the most comprehensive in terms of the presence of complexes of regional dimension (14 landscape provinces) [5] with a much smaller area (than the above regions). The complexity of the mesolandscape structure also determines a much more complex local structure, which requires a special approach when solving the problems of spatial organization at the municipal level. So, when comparing the Russia’s regions in the south of the Far East, Khabarovsk Territory is distinguished by the largest number of types of landscapes – natural complexes used for territorial studies at the municipal level (Table 1).

At the same time, even some regional landscapes are not reflected in the PA of Khabarovsk Territory, not to mention geosystems of lower taxonomic levels. For example, in the northern taiga zone, the PA cover only reserves on the area of 8.9% of this zone (Table 2).

Table 1. Representation of landscapes in the south of the Far East

| Taxa of the landscape hierarchy | Khabarovsky Krai | Jewish Autonomous region | Amur region | Primorsky Krai |
|---------------------------------|------------------|--------------------------|-------------|----------------|
| Type | 4 | 3 | 3 | 2 |
| Subtype | 6 | 3 | 3 | 2 |
| Class | 19 | 9 | 12 | 7 |
| Species | 28 | 13 | 14 | 16 |

The rest of the zones are represented in different PA categories, while the current PA system does not guarantee the safety of natural landscapes.

Table 2. Portion of the Protected areas of the total area of Khabarovsky Krai natural zones

| Natural zones | The area of natural zones, ths km ² , % | Nature reserves, % | National parks, % | Fish and game reserves of national supervision, % | Fish and game reserves of regional supervision, % |
|--------------------------|--|--------------------|-------------------|---|---|
| Northern taiga | 99.6 (100 %) | - | - | - | 8.9 |
| Middle taiga | 312.2 (100 %) | 3.7 | 0.78 | 1.93 | 1.22 |
| Southern taiga | 320.6 (100 %) | 0.83 | 0.09 | 0.45 | 2.12 |
| Broad-leaved forest zone | 56.0 (100 %) | 3.8 | 7.1 | 1.0 | 14.5 |


4. Conclusion


Research carried out in the region has shown that the ratio of landscapes protected within PA to their diversity does not make it possible to ensure both the conservation of natural complexes and maintenance of their ecological balance while enhancing economic activity [3, 6]. Consequently, the “conservation of the LD” should be considered not only through the inclusion of natural complexes in the system of protected areas, but also in the establishment of optimal management regimes by taking into account their natural characteristics, ensuring the maximum implementation of ecosystem services.

Thus, when developing regional environmental programs, “conservation of landscape diversity” should be considered in the context of system of key indicators. The following indicators are proposed: *the representation of the diversity of natural complexes* (a certain set and proportion of landscapes that are of particular importance in maintaining ecological balance), the proportion of *key landscape territories* (all ecologically significant geosystems at a regional or local level).

The current situation with the fulfillment of the task of the LD conservation, indicated in the program documents of Khabarovsk Territory, despite its importance and timeliness for the region, remains difficult to solve.

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