
Natural-Resource Potential Management of Region's Territorial Ecosystems

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Abstract

In modern conditions, when more and more countries build their national policies in the field of socio-economic long-term development on the principles of sustainable development, the problem of evidence-based assessment of natural resource potential of regional is extremely important. Methodological support to the processes of calculation and evaluation of all components of the natural-resource potential is a prerequisite for the development of effective management decisions made at both national and regional levels. The purpose of this study was to substantiate the list of criteria that will help to be used both for assessing the natural resource potential of territorial ecosystems of regions and for evaluating their effectiveness, as well as defining a set of promising measures to improve the natural resource potential of regional territorial ecosystems. For the study, the methods of content analysis, factor analysis, data systematization, method of expert assessment, the method of expert assessment coordination, SWOT analysis, and other scientific approaches were used, allowing to comprehensively consider the problem under study. As a result of the study, scientific approaches to the definition of the concepts of "natural resource potential" and "ecosystem" were clarified, as well as to determine the main groups of factors influencing the natural resource potential of territorial ecosystems of the region. "Natural resource potential" and "ecosystem". In addition, based on a study of existing research in this area, the main groups of factors that influence the natural resource potential of the region's territorial ecosystems were identified. The materials of the article can be used in the development of an environmental-oriented strategy for the development of regions, as well as a set of environmental measures to preserve territorial ecosystems.

Keywords: ecological problems, natural resource potential, ecosystem, regional management, ecology, nature protection measures

Zaitseva NA, Larionova AA, Filatov VV, Rodina EE, Zhenzhebir VN, Povorina EV, Palastina IP (2018) Natural-Resource Potential Management of Region's Territorial Ecosystems. *Ekoloji* 27(106): 495-502.

INTRODUCTION

Despite the fact that research in the field of natural resource potential and ecosystems is quite a lot (Arakelova 2001, Avetisova 2012, Kurnykina et al. 2018, Malinenko 2002, Muths and Dreitz 2008, Salikhov 2004), the severity of the problem to ensure the management decisions effectiveness in this area is not reduced, but rather increases, since there are other equally important issues, which in some countries are the priorities (growth of political tensions, increased migration, the rise in unemployment and a decrease in the solvency of the population, and other (Bragin et al. 2018, Kevorkova et al. 2018, Konopatskaya et al. 2016, Kozelskiy 2001, Ushakov et al. 2018).

Therefore, further research is aimed at finding ways to minimize the effects of socio-economic development of countries and individual regions on the ecosystems of these areas by improving environmental legislation, the introduction of new and modification of existing standards and norms of environmental requirements.

State management of the natural-resource potential of territorial ecosystems should be aimed at restructuring national and regional economic systems based on energy and resource conservation, introducing environmentally friendly technologies, and creating an ecological culture of the population.

Analysis of available research results in this area has shown that the most difficult issues remain:

- systematization and generalization of the best practices for assessing and managing the natural resource potential of territorial systems of regions;
- justification of the list of criteria that will help to be used both for assessing the natural resource potential of territorial ecosystems of regions, and for evaluating their effectiveness, as well as testing this list of criteria and indicators using individual regions as an example;
- identification of factors of the external and internal environment (SWOT- analysis) that have the greatest influence on the management decisions in the field of improving the natural resource potential of the territorial systems of the regions;
- development of a list of the main activities to improve the management of the natural resource potential of the territorial systems of the regions, which can be specified and refined at the level of individual territories, taking into account their unique features.

LITERATURE REVIEW

Reimers (1994) proposed to consider the natural resource potential on the one hand, as part of the natural resources of the Earth, which can actually be involved in economic activities under given technical and socio-economic conditions of society, while preserving the environment of human life. On the other hand, as a set of natural resources, conditions and processes, which forms the basis of the life activity of society and opposes it as an object of anthropogenic impact.

It seems appropriate to use the definition of natural resource potential, given by Glukhova (2004), which notes that this kind of potential represents “the quality and quantity of natural resources necessary for economic development in the prevailing economic conditions, while maintaining its natural state”.

The ecological system (ecosystem) as a set of interdependent and interrelated elements (living organisms and their habitat) is one of the most important components of the natural resource potential of any territory.

Each ecosystem is more or less able to withstand the negative impact of environmental factors. Depending

on the nature of the ecosystem response to negative external influences in the scientific environment (Gutnikov and Alekseeva 2012, Kotko 2007), it is customary to divide ecosystems into:

- systems with local stability (local stability), characterized by the ability of an ecosystem to preserve structure and functions with a negative external effect,
- systems with general stability (global stability), in which the ecosystem is able to restore its structure and functions when part of its components are lost.

RESULTS

Assessment of the Main Elements and Types of Natural Resource Potential in the Russian Regions

In assessing the natural resource potential of the Russian regions in the Federal Districts, it is possible to point out large disproportions between the available area of the territories of the federal districts and the population in these territories. If we translate the absolute values of these indicators to share ones (the share in the value of the indicator throughout the Russian Federation), then according to **Fig. 1**, it will be seen that only the North-West Federal District has approximately the same share, both in territory and in population.

The largest discrepancy in the direction of exceeding the region's share in the territory over the share in population is noted in the Far Eastern Federal District - by 8.5 times. In the Central Federal District, the situation is almost “mirror” - the region's share of the population is 7 times the share of the region's territory. At the same time, most of the population is concentrated in the capital, Moscow. If, according to the preliminary census, as of 04/02/2018, the total population of the country is 146.9 million, with 74% of the population being urban residents (Federal State Statistics Service, 2018), then 12.5 million people live in Moscow, i.e. 8.5% of the total population of the country.

Next, we consider one of the types of natural-resource potential of the territorial systems of the region - the recreational potential. The choice of this type of natural resource potential is explained by the fact that this kind of territorial potential, on the one hand, is highlighted there by many researchers in the field of

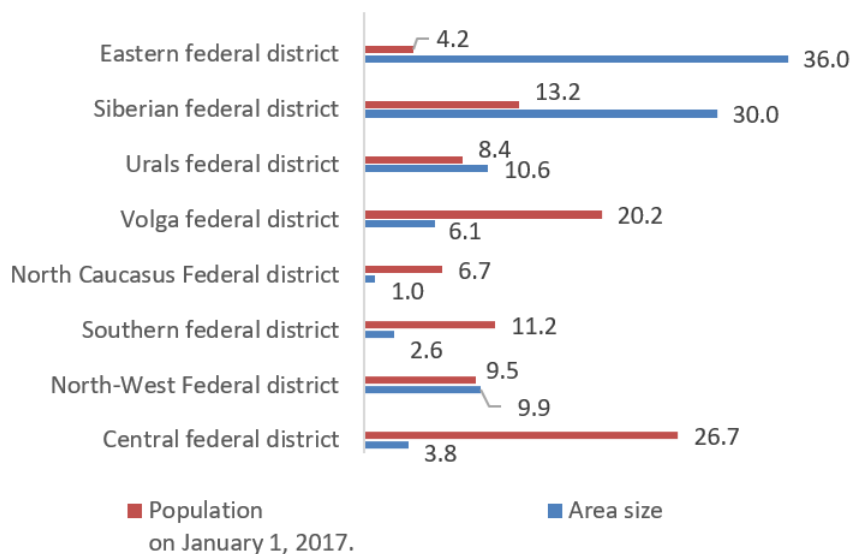


Fig. 1. Shares of federal districts of the Russian Federation in the all-Russian values of the indicators “area of the territory” and “population” as of 01/01/2017 (Collection “Regions of Russia. Socio-economic indicator” 2017)

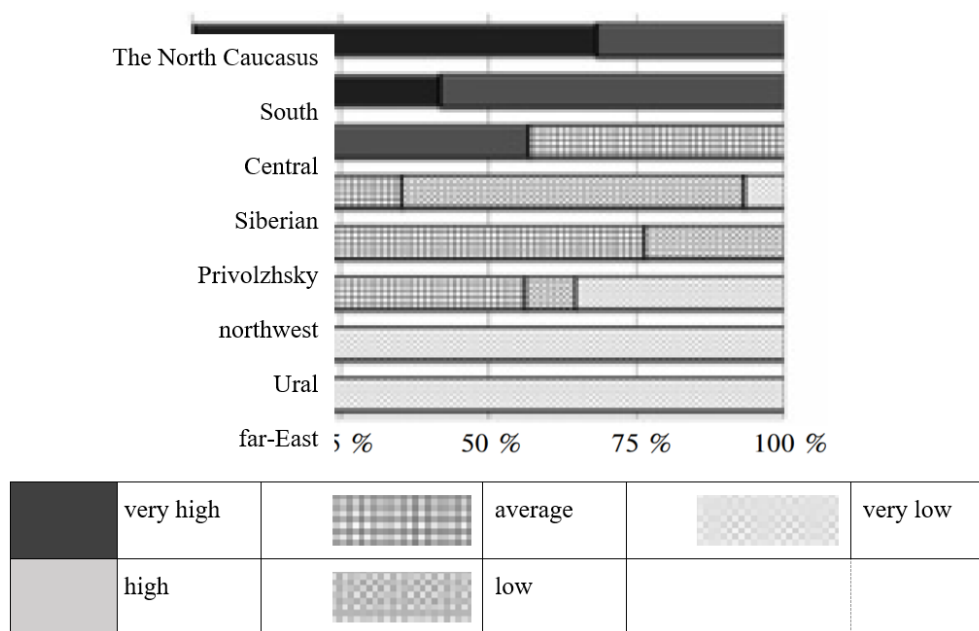


Fig. 2. Assessment of the recreational potential of the federal districts in the Russian Federation (2014)

natural resource potential, and secondly, it is most sensitive to changes in territorial ecosystems.

According to (Lobkovskii et al. 2014), the recreational potential of the territory is based primarily on a set of natural resources that are already used to meet the needs of the population for recreation, or can be potentially used for these purposes. The greatest demands from the population interested in recreation are areas with good climatic factors, the optimal combination of temperature, humidity, wind and radiation conditions, as well as the presence of water and hydro-mineral resources, which are used for medicinal purposes. These regions primarily include the

territories of the Southern and North Caucasian Federal Districts. Therefore, in these federal districts, the level of recreational potential can be estimated as the maximum (very high) (Fig. 2).

At the same time, the recreational potential also includes objects of display, natural and artificial attractions, which are used in compiling tours of various types of tourism: cultural, historical, educational, religious and others. The greatest concentration of such objects is noted in Moscow and St. Petersburg. Due to this, in the Central and Northwestern Federal Districts, the level of recreational potential is determined as high and medium, respectively.

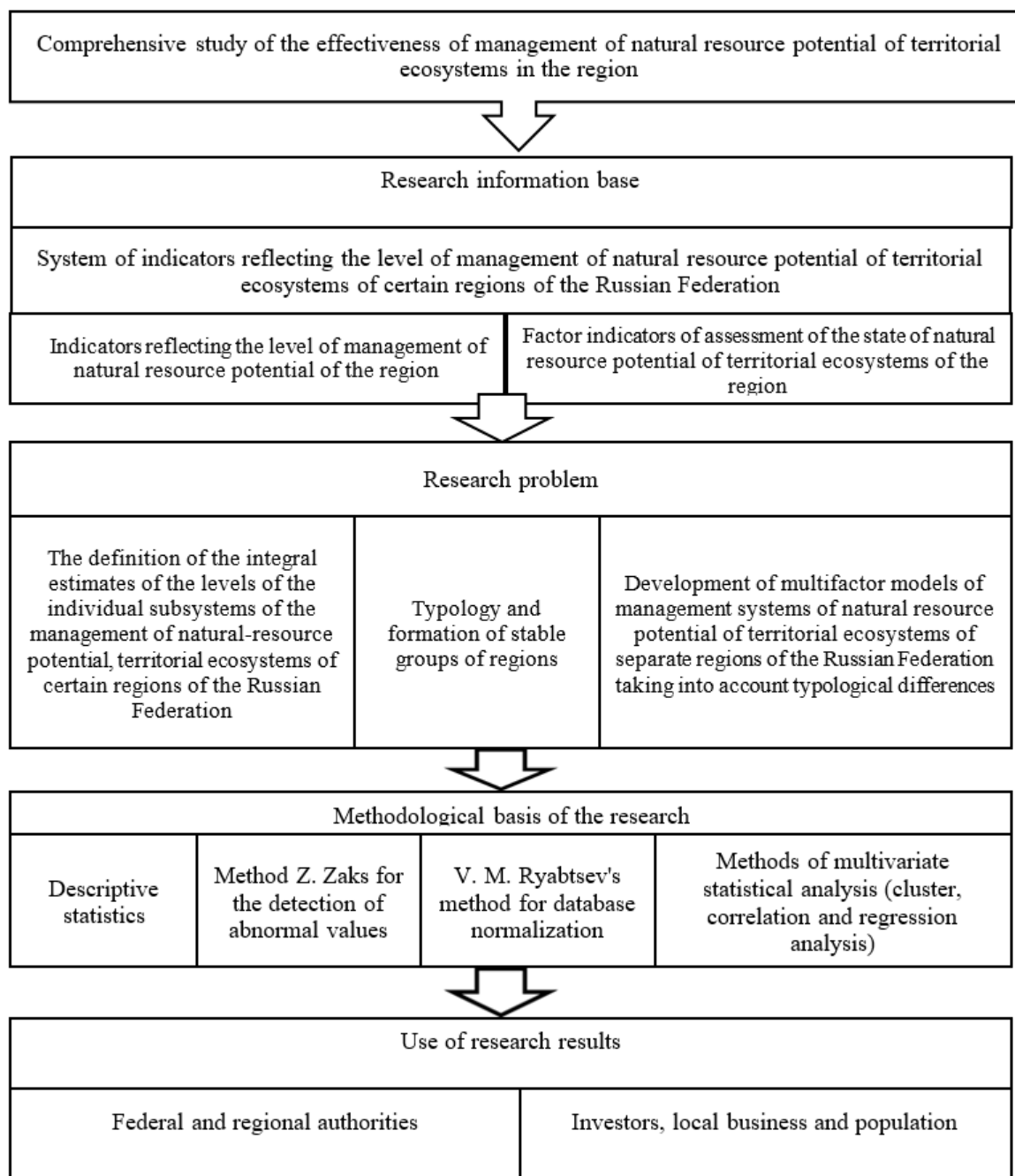


Fig. 3. Sequence of the management efficiency study of the natural-resource potential of the territorial ecosystems in the region

Also, in recent years actively developing the above-mentioned types of tourism in Kazan, Kaliningrad, Nizhny Novgorod, Yaroslavl, Vologda (The Most Tourist Cities of Russia the 2017).

The data obtained generally correlate with data from other researchers (Lobkovskii et al. 2014), which are noted among the regions with the highest aggregate values of the components of the natural resource potential of the regions and cities of the Russian

Federation, primarily Moscow and St. Petersburg, as well as the Belgorod, Moscow and Yaroslavl regions.

Methods of Conducting Comprehensive Studies of the Management Efficiency of the Natural Resource Potential of the Territorial Ecosystems of the Region

The standard scheme for the study of socio-economic systems involves the rationale primarily of the information base of the study, the objectives and methodology of the study (Fig. 3).

The information base should include indicators that can be used to assess the level of management of the region's natural-resource potential, as well as a group of indicators reflecting the most significant factors influencing the state of the territorial ecosystems natural-resource potential of a particular region.

As the methodological basis of the study, the authors of the article used the approach outlined in the work (Konopatskaya et al. 2016), those methods of descriptive statistics, Z. Zaksa method to detect abnormal values, the method of VM. Ryabtsev for the normalization of the database, and methods of multivariate statistical analysis (cluster, correlation and regression analysis).

The main users of the study results of the managing territorial ecosystems' natural resource potential effectiveness of region are federal and regional authorities, as well as real and potential investors, local business and the population.

Factors Affecting the Natural Resource Potential of the Territorial Ecosystems of the Region and Indicators of their Assessment

Analysis of existing studies on the methods development for assessing the territorial ecosystems' natural resource potential of the region and the selection of indicators for this assessment (Ecosystems and human well – being 2005, Muravykh 2007, Pagiola and Konrand 2004, Smorodinskaya 2014) There are several basic approaches:

- it is the most common approach, which can be designated as the “exposure-condition-response reaction”. This approach is developed by experts of the European Union and the Organization for Economic Cooperation and Development. The application of this technique allows to evaluate both the parameters of the human activity impact on the environment (“impact”), and changes in the quantity and quality of the natural resource potential as a result of such impact (“state”), as well as the effectiveness of the economic, sectoral and environmental policy implementation at all levels of territorial management (“response”);
- the second approach is also developed by experts of international organizations - the UN and the World Bank. It can be formulated as a “problem - indicator”, i.e. Indicators are selected depending on which problems related to the conservation of territorial ecosystems are the most important, both at the international, national and even municipal levels.

- and finally, the third approach, which is found in various modifications in the works of many scientists, is the choice of the most important (key, basic) indicators, additional, as well as specific territories.

In addition to the difficulties in choosing a system of indicators for assessing both the natural resource potential of the region's territorial ecosystems and management decisions in this area, there is also the problem of choosing units of change for the indicators themselves.

Often in the methodologies for assessing the natural resource potential of the territorial ecosystems of a region, a system of scales is used, including in a point estimate. However, this approach gives a rather subjective assessment, since depends largely on the opinions of experts who are involved in such an assessment. Therefore, the authors of the article support the opinion of Lobkovskii et al. (2014) that in order to assess the heterogeneous elements of the natural resource potential of the territorial ecosystems of the region, it is necessary to convert the values of all indicators into a single dimensionless form, that is, the translation of the initial quantitative (numerical) value into the final qualitative (verbal) value.

Based on the approach suggested by Kostylev (2010) we select groups of factors affecting natural-resource potential of territorial ecosystems of the region, which can be assessed quantitatively, as well as on the basis of what dynamics is observed for those or other indicators (**Fig. 4**).

The use of indicators set forth in **Fig. 4**, is able to evaluate the natural-resource potential of the regional ecosystems, as well as to build their system based on strategic measures and monitor their implementation of interim results.

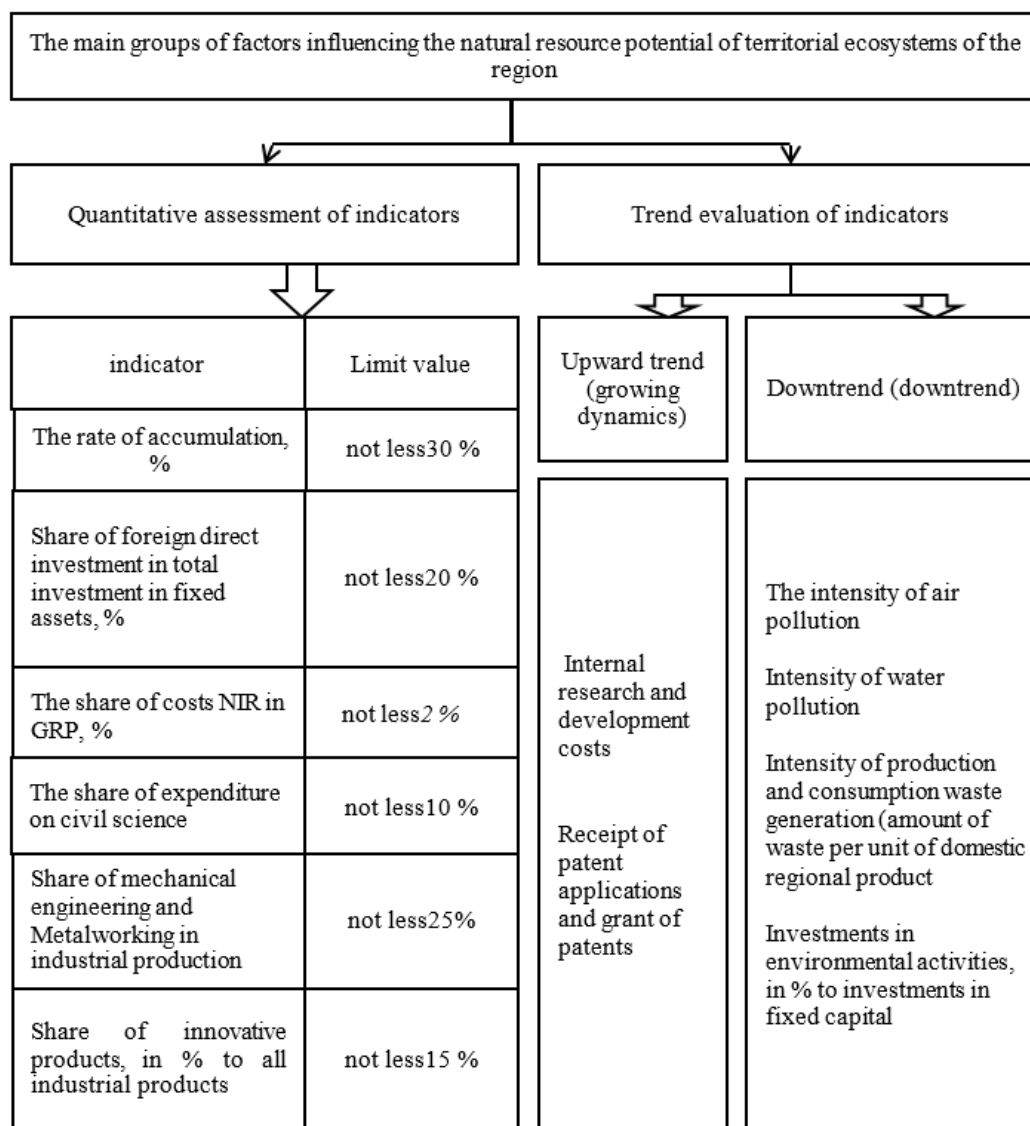


Fig. 4. The main groups of factors affecting natural-resource potential of the territorial ecosystems of the region

DISCUSSION AND CONCLUSIONS

As noted at the outset of the paper, the assessment of the natural resource potential of regions and ecosystems of individual territories has long been widely studied by many scientists (Barbier 2017, Munasinghe 2004). Among Russian scientists many of them are noted in works by Reimers (1994), Vidyapin and Stepanov (2009), Vakorin (2013) and others.

The study of managing natural-resource potential of the regional, which is reflected in this article, is a continuation of previously conducted researches by the authors examining the issues of sustainable development and environmental consciousness (Makarova and Rodina 2016, Rukina and Filatov 2017, Rukina et al. 2018, Sagina et al. 2018); state regulation and solving socio-economic problems of the regions (Butakova et al. 2018a, Erdynyeva et al. 2016, Oreshina

et al. 2017); the application of innovative forms of resource conservation (Lubnina et al. 2016); state support of innovatively active and socially responsible organizations (Butakova et al. 2018b). However, due to the scale of the problem investigated in this article, and the constant growth of its relevance, further research is needed in this area (Mundaca and Markandya 2016). Based on the results of this study, and substantiated by the authors methodical bases of perfection of managing natural resource potential regional ecosystems, it will be important in the future to consider establishing effective implementation of the control system of environmental protection measures, as well as monitoring the intermediate results of ecological-oriented regional development strategies.

According to the results of the study it can be concluded that the state regulation strategies of

managing regional ecosystems natural-resource potential should be based on the minimization of implementation principles losses of various development projects in specific areas. It can be also based on failing to minimize the loss, therefore on full compensation for losses in ecosystem structure and functions through the implementation of a set of environmental measures.

To do this, it is necessary above all to have clear ownership rights for certain types of natural resources

located within the boundaries of specific regions. In addition, it is important to develop and further improve environmental legislation, which should regulate the use, reproduction and protection of certain types of resources within certain regions. It is important to create a system of encouraging regional and local businesses to implement environmental projects and switch to environmentally friendly activities. Of course, all these measures will not be effective unless the mechanisms for controlling and regulating the quality of components of territorial ecosystems are in place.

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