

Role of maintaining real estate cadaster in environmental sustainability formation in the Russian Federation

A.M. Polikarpov^{1}, Yu.E. Polikarpova¹, O.M. Mater¹, F.V. Svoykin¹, O.N. Leonova², V.A. Kaigorodova³, and M.A. Kovtun³*

¹St. Petersburg state forestry university, 194021, Institutskiy lane, 5, St. Petersburg, Russia

²Saint Petersburg State University of Architecture and Civil Engineering, 190005, 2nd
Krasnoarmeyskaya street, 4, St. Petersburg, Russia

³Moscow aviation institute, 125993, Volokolamskoe highway, 4, Moscow, Russia

Abstract: Modern sustainable formation of land management of territories in the Russian Federation among other things has a significant environmental aspect, the role of which increases every year in the early 2020s. Formation of a qualitative sustainable ecological state of the state requires the maintenance of qualitative and qualitative accounting, actual monitoring of the state of land in the Russian Federation. The article considers and analyzes the current order of the real estate cadaster in the Russian Federation from the point of view of the formation of a sustainable ecological state of the land of the state and its direct relationship in the current system of accounting and environmental monitoring of land according to the current regulations. The analysis of the role of improving the environmental component of land management and real estate cadaster in the context of monitoring and evaluation of systematic analysis of incoming information in terms of the practical component of the implementation of such information. The role of environmental studies for the formation of criteria and quality level of works on land management and real estate cadaster is assessed. Key words: state cadastral registration of real estate, unified state register of real estate, inventory of real estate objects, environmental monitoring of lands, cadastre, real estate, register, environmental legislation, accounting, law.

1 Introduction

According to the current legislation, the purpose of the real estate cadastre in the Russian Federation is to form a standardized database (register) of data on real estate on the territory of the state with a description of its main characteristics, location, and rights. In this regard, the question arises about the possibility of using the formed register: the Unified State Real

* Corresponding author: anatol-06@bk.ru

Estate Register (USRN) for the purposes of the current environmental legislation [1, 2, 3, 4, 5].

2 Materials and Methods

The main purpose of this branch of law is the preservation of the Earth's natural resources and environmental protection [6, 7, 8]. At the same time, we can formulate the main theses, which this law regulates (Fig. 1).

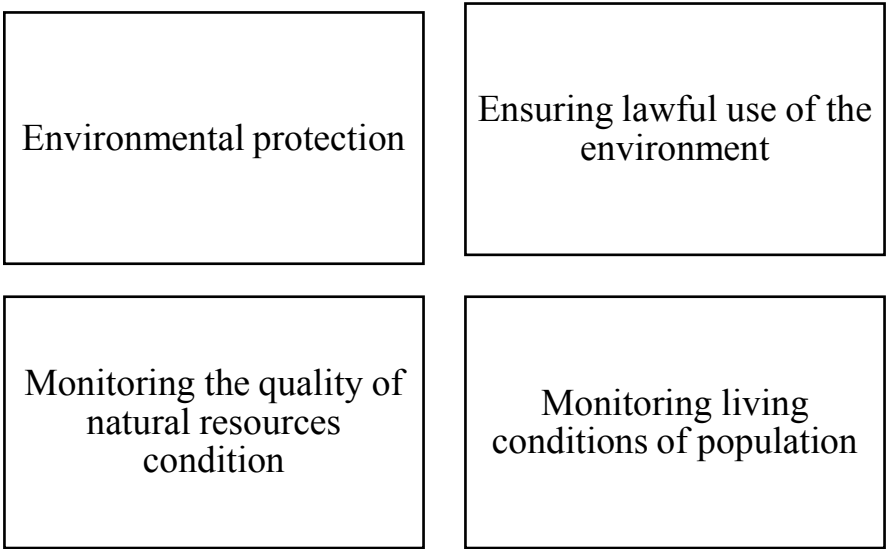


Fig. 1. Main theses of environmental law in the Russian Federation

First of all, it should be noted that the legislation of the Russian Federation specifies the state monopoly on natural resources within the borders of the country. In this regard, the state has a full package of obligations to preserve, restore and regulate their use.

Accounting and evaluation are two facets that allow to assess the same phenomenon from two positions - quantitative and qualitative. Quantitative accounting objectively reflects the existing state of affairs - for example, how many sources of pollution a given nature user has, how many pollutants enter the environment as a result of its activities, how much waste is generated, how much water it consumes, etc. The qualitative accounting also includes the quantity of waste generated, how much water it consumes, and so on. Qualitative accounting has both objective and subjective (evaluative) elements. It is the qualitative side of accounting that allows to consider it as an economic tool.

3 Results and Discussion

One of the traditional forms of accounting - keeping cadastres of natural resources (land, forest, water, etc.) did not have a significant applied value earlier, since economic assessment of resources in the absence of market relations and paid nature use was practically unclaimed.

One of the most difficult tasks to be solved in the future is the search for new forms of accounting and management, within the framework of which interrelations between:

- quantitative and qualitative accounting of natural resources and nature users;
 - their comprehensive socio-economic assessment;
 - assessment of the ecological state of territories, including the presence of environmentally hazardous sources (e.g., waste storage or disposal sites, sources of emissions and discharges of pollutants, other sources of harmful impact) and economic assessment of the consequences of the activities of natural resources and nature users.
- and economic assessment of the consequences of these sources;
- opportunities for multivariate (alternative) management of the same resources or natural complexes;
 - payment for nature use;

A more modern understanding of the role of accounting and assessment in the structure of the economic mechanism of environmental protection requires a number of adjustments with regard to the levels of accounting, the range of subjects, objects of accounting and assessment, creation of conditions under which the accounting and assessment data would be really demanded and would have a significant impact on the state of the natural environment.

The fragmentation of cadastral information within the framework of different agencies carrying out accounting, incomparability of data contained in separate cadastres, lack of indicators in cadastres that allow to assess the environmental and economic efficiency of natural resources use can be overcome within the framework of integrated territorial cadastres of natural resources.

Accounting in relation to the goals of the economic mechanism of environmental protection should fulfill not only informational and evaluative, but also fiscal functions. This does not provide for the maintenance of special fiscal cadastres of natural resource users (resource users and environmental polluters). Their primary accounting as taxpayers or subjects of payment for nature use is carried out mainly in the process of licensing, conclusion of contracts for various types of nature use or state registration. Specificity of fiscal accounting in the sphere of nature use consists in the fact that not only subjects, but also objects of taxation or payment are subject to accounting, or more precisely, their quantitative and qualitative parameters (for example, the size of the land plot, the area of the used water area, the volume of discharged wastewater).

Due to the anticipated transformation of the payment system into taxes, tax authorities will inevitably face accounting difficulties. The problem is that information on the official and real payment base (e.g., the mass of pollutants entering the environment, the amount of wastes disposed, etc.) will be accumulated in licensing bodies (Ministry of Natural Resources of the Russian Federation, etc.), while the relevant tax declarations will be submitted by the subjects to the tax authorities.

In order to coordinate efforts to record the subjects of payment, the Ministry of Taxes and Levies adopted joint documents (with the Ministry of Natural Resources of the Russian Federation, the State Committee for Ecology of the Russian Federation, the State Committee for Land Resources of the Russian Federation, etc.) regulating the procedure for mutual exchange of information on taxpayers and objects of taxation.

For the purposes of collecting payments for the use of natural resources, environmental taxes, and compulsory environmental insurance, it is necessary to keep track of the users of natural resources, for example, by keeping an appropriate register that would rank them according to the assessment of the environmental danger of their activities. It is also necessary to establish their responsibility for timely provision of complete and reliable information on the scale of their environmental impact.

At present, the concept of "ecological zoning" is often used; it includes not only the survey of the natural characteristics of the land plot, physical parameters, and economic aspects of the location area, but also the choice of the most rational direction of land use,

the prospect of ecological development of the territory, and the possibility of organizing a safe ecological environment.

In order to implement an integrated approach to the environmental assessment of urbanized areas, it is proposed to consider natural and technogenic components in a complex.

Environmental monitoring in this case may well be based on geoinformation modeling, which is already actively used in the real estate cadastre. Let us draw up a scheme of formation of the environmental monitoring system with the use of modern geoinformation modeling and USRN data (Fig. 2). It is the cadastre system that can provide the basis: data on land rights, data on existing real estate objects.

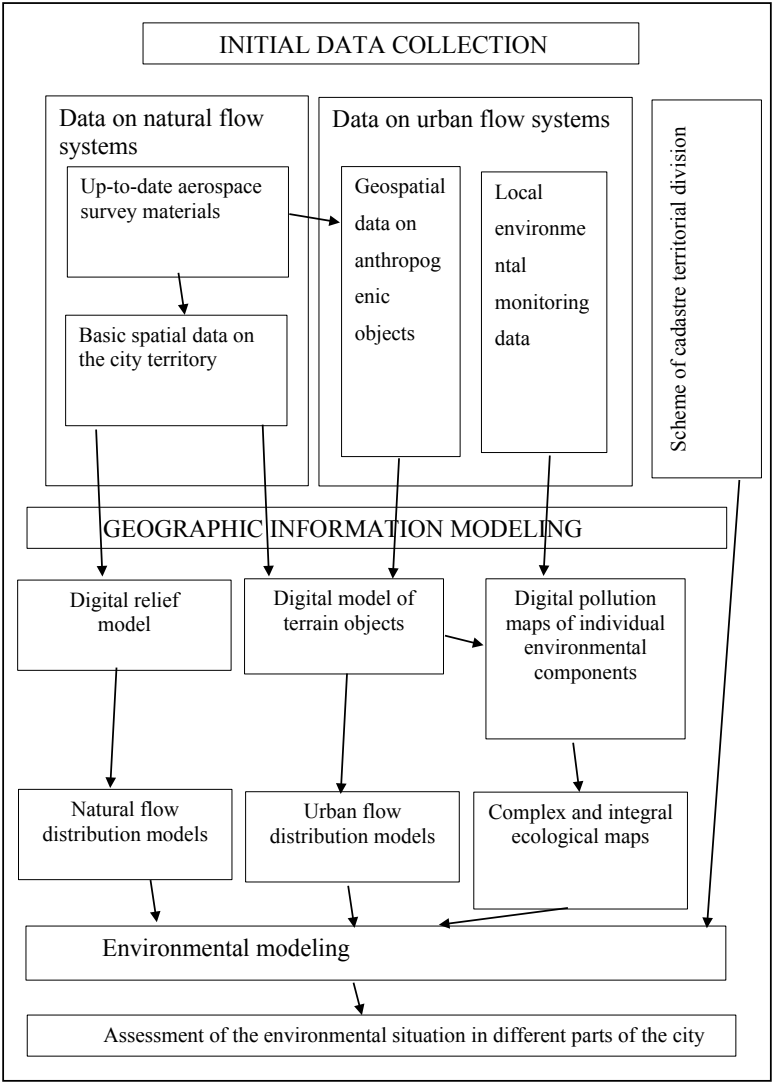


Fig. 2. Formation of the environmental monitoring system using modern geoinformation modeling and USRN data

Geoinformation analysis and modeling of the above data is performed in geographic information systems (GIS), which have developed tools in the field of construction and study of cartographic volumetric models (3D-models), establishment of spatial relationships between objects. This allows solving the following tasks:

- identification of the main patterns of underlying surface pollution for environmentally safe planning of development of residential development;
- determination and assessment of erosion risk, making recommendations on the use of different terrain areas taking into account the erosion situation;
- modeling of zones of pollution of the surface layer of the atmosphere by large stationary sources (Thermal Power Plants, etc.) for planning of high-rise residential development (above 16 floors);
- analyzing the distribution of pollutant flows from existing and planned industrial facilities for various purposes;
- justification of the location of new residential and green zones, projected industrial enterprises and infrastructure facilities, taking into account the requirements of environmental safety for the health of the population;
- identification of priority areas in the field of environmental protection, making recommendations to improve the quality of life of the population.

In general, the results of 3D modeling lay the foundation for a detailed assessment of the urban environment taking into account various criteria (cadastral, geodynamic, environmental, medical and biological) and the creation of the resulting cartographic products of the relevant topics, acting as part of the information support for territorial planning of urban land use

A separate issue is the maintenance and condition of urban green spaces (UGS), which are considered as part of the urban environment, but not as independent objects [9, 10]. Tracking the number of trees and their condition is a difficult task [11, 12], and holding accountable those involved in the destruction or damage of green spaces becomes even more difficult. The need to make decisions on the maintenance and development of the city's green fund requires the creation of a reliable database of all available green spaces, because in the absence of information on the number and condition of trees, as well as the presence of unreliable data, there may be additional costs from the budget to eliminate the consequences [13]. Inventory of UGS at the moment is carried out either by municipal authorities once every 5 years, guided by morally and technologically outdated regulatory and legal documents, or by passportization by private organizations, whose services are expensive.

At the current speed of urban environment changes such pace of works is unacceptable [14].

Since currently the legal status of UGS is not specified, and they are considered only as part of the urban environment, not as independent objects, and monitoring is currently carried out very rarely. It is the real estate cadastre, which is based on up-to-date information about the territory, in particular due to data from unmanned aerial vehicles (UAVs), as well as satellite imagery data, which objectively indicate the state of the territory's environment: landscaping, soil and land cover. On the basis of such data it is possible to perform desktop calculation of qualitative indicators of the territory: percentage of green areas, presence of unauthorized dumps, location of territories - sources of pollution (industrial territories, territories of medical institutions, cemeteries, etc.).

Summing up, it should be noted that the modern stage of digitalization promotes the development of real estate cadastre, which can be implemented and deployed in existing environmental monitoring systems at all levels of government (national, regional and municipal). At the same time, it is necessary to take into account such opportunities at the level of lawmaking with the creation of electronic systems of interaction between the

population and the state to provide data on the ecological state of the environment, especially in populated areas [15, 16].

There is a need to replace the supremacy of economic interests of the relationship between man and the environment with ecological dominants, which would determine the economic direction of development. This requires strengthening of ecological research to establish regularities and transformation of the natural environment to identify criteria for assessing the environmental situation in order to establish the economic opportunities of the territory and forecasting changes in the environmental situation [17].

For this purpose, first of all, it is necessary to supplement the characterization of the ecological state of the objects of exploitation, especially if it is related to land. Among the first to this are the activities on land management and real estate cadastre maintenance, in which the environmental components are reflected very insufficiently or are absent at all.

The introduction of new environmental characteristics for the production of land management activities and cadastre management improves the quality of the works, which should meet the increased modern requirements with the mandatory consideration of environmental protection and the forecast of the direction of environmental development [18].

Improvement of the environmental component of land management and real estate cadastre obliges to conduct a systematic analysis of incoming information and the necessary information to implement in practice. Of course, such work can be performed only by specialists professionally trained to solve such problems. In this connection there is a problem of training such engineers in higher educational institutions. Thus, in the course of lectures on land management and real estate cadastre management, it is necessary to introduce the sections providing knowledge of environmental orientation, which are oriented to these disciplines.

4 Conclusions

As a result of the research it can be concluded that ecological studies significantly improve the quality of works on land management and real estate cadaster, as they contribute to the characterization of management objects the necessary scientifically based information, which reflects the real reality expressed in the criteria of ecological assessment of such important indicators as the economic capacity of the territory, i.e., the limits of environmental opportunities, the exhaustion of which leads to undesirable changes, the ecological functions of the lithosphere of a certain lithosphere.

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