

## Zoning as a tool of land management

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**Abstract:** The article describes the zoning of Russia as part of strategic planning. The draft project "Spatial Development Strategy" developed by the Ministry of Economic Development is analyzed. The composition of the zones of this project is compared with authors' zoning results based on land and property development indicators and influencing factors. The conclusion about poor accounting of land resources and land relations in strategic planning was drawn.

### 1. Introduction

The national land fund is a national wealth whose rational and effective use is impossible without an appropriate management system. In the market economy, it is necessary to develop organizational, legal and economic mechanisms that form an environmentally and economically viable system of objects and subjects of land management, increase budget revenues and implement the most economically and environmentally sustainable forms of state, municipal and private land management [1]. The land management system may federal, regional, municipal and intra-economic depending on the form of ownership of land and a body performing management functions. The main way to achieve strategic goals of sustainable development of Russia and ensure national security is implementation of strategic national priorities, including priorities of socio-economic development of the Russian Federation which is impossible without an effective system of land management.

Land management includes land management, record-keeping (real estate cadaster maintenance), land monitoring, land supervision and control, land use planning and other activities. One of these activities is zoning. The institute of zoning was formed as a result of the need to develop mechanisms for land management, regulation of land management relations caused by various state and public processes (urbanization, scientific and technical progress, expansion of industrial production, pollution of the environment, etc.). Various regulatory documents mention assessment, cadastral, town-planning, functional, territorial, ecological, economic, agricultural and other types of zoning. Regulation of zoning activities is complex and intersectoral; conditions and zoning procedures zoning are regulated by various branches of legislation. Thus, it is necessary to solve theoretical and methodological issues of formation of an effective land management system based on a scientifically justified zoning system which can become a form of management and control over the territory management, a tool of political power aimed at the dynamic and sustainable development of land and natural resources. The authors have already addressed some types of zoning. Contradictions between the results of different types of zoning make it extremely difficult to use them in managing the land and property system of the region, especially in planning and creating a territory development strategy as one of the main management documents according to the law "On Strategic Planning in the Russian Federation". It is necessary to use a complex zoning method accounting for various factors and natural, social, economic and anthropogenic features of regions and municipalities.



The institute of zoning of territories was formed as a result of the need to develop mechanisms for land management, regulation of land management relations due to various public processes. The term “zoning” is often defined as urban planning zoning which is not correct, since urban zoning is a special type of zoning, since “zoning” combines a variety of different types: legal zoning of agricultural land and settlements, restrictive zoning, cadastral, estimated, functional, construction zoning, division of the territory of a national park into functional zones, etc. Many legal scholars addressed the issue of territories. However, most of them dealt with the legal content of the zoning institute, specifics of a legal regime in individual territories, and did not take into account that the content of relations in the area of zoning is wider than the subject of legal regulation of land relations.

Over the past years, there has been a tendency to identify the concept “zoning” with territorial zoning. Many scientific publications analyzing pros and cons of the transition from land categories to the territorial zoning [2-6] appeared. When developing a scientifically justified zoning system for land management purposes, it is necessary to study and take into account the and foreign experience. In other countries, the zoning is an aspect of the territorial planning.

In foreign countries, it is common to distinguish between two groups of zoning systems – American (high autonomy of local governments, declaration of policies in various areas in the form of strategic socio-economic development plans, zoning of the entire territory and its components) and European (a set of national systems that differ from each other). The main goal of zoning is to determine the scope for limiting rights to property in the communal interests.

In the US, zoning is a regulatory tool of the government. Development of territories began with monofunctional zones (tools for urban planning). They are based on the principle of land division into residential, commercial and industrial areas. Monofunctional zones have negative economic consequences and worsen the social situation. The reason for these negative consequences are associated with urbanization, environmental pollution, racial and socio-economic segregation [7]. Four types of zoning are currently used in the USA: Euclidean, functional, stimulating, and territorial. The Euclidean zoning is most common [8]. It is characteristic of areas where the land use is limited to certain activities within the district. The positive aspects of this type are many years of experience, accumulated practice and easy application. The negative sides are as follows: the lack of flexibility and the outdated model of territorial planning [9].

In Delhi, the planning department is responsible for development of the five-year plan and annual plans which include evaluation of financial resources, maintenance, monitoring and evaluation of the five-year and annual plans. For each 15 zones, a zonal development plan should be developed. In addition to zones, there are subzones which are part of a zone with a strictly specified use approved by the model plan [10]. Thus, Western zoning systems are territorial development planning systems (legal zoning) aimed at defining the scope of restrictions on the rights to real estate objects used in the interests of the community. In Russia, the zoning is a complex multidimensional concept: a legal institution, a mechanism for regulating economic and other activities, and a management function.

## 2. Research methods

The land fund of Russia which is an object of land management is heterogeneous. Land resources have different climatic (the territory of the country stretches from permafrost to subtropics), soil (65 main soil types), areal (the area of the largest Russian region (Sakha Republic) is 3,568 times larger than its smallest subject (Sevastopol), legal (division into 7 categories of land and 13 types of permitted use), economic (the cadastral value of land plots differs 217 times), administrative (the share of regional ownership of land varies from 32 to 100%) characteristics. It is necessary to unite the regions by their characteristics affecting land management.

The Federal Law “On State Strategic Planning” laid a basis for development of strategic planning documents. The main regional document is the strategy of socio-economic development. This document regulates economic aspects of the territory, including land management and economic land and property relations. All the Russian regions adopted strategies for their socio-economic development until 2025 or 2030. According to [11,12], less than a quarter of the Russian regions included the analysis of their

land resources and regional land and property relations in these documents. More than 60% of the regions included no more than 2 strategic priorities in their strategies. In 2018, the Ministry of Economic Development developed a draft Spatial Development Strategy implying zoning of the national territory into 14 macroregions. The country was zoned based on natural, climatic, economic, social, development characteristics of the regions. The land and real estate objects located on were not accounted when determining boundaries and composition of macroregions. The authors zoned the Russian regions based on the land resource and real estate objects development indicators. 72 characteristics were used divided into several groups were used:

1. **Indicators of cadastral registration and property title registration**, including the number of registered land plots, issued certificates, registered rights, etc.;
2. **Indicators characterizing the land fund of the region**, including the structure by categories, areas of land plots, etc.;
3. **Indicators of public land control**, including the number of inspections, violations, fines, etc.;
4. **Indicators reflecting the state of the land market**, including the number of transactions, the area of land plots sold and leased, etc.;
5. **Cost indicators**, including the cadastral value of land, the amount of land tax, rental charges, etc.

### 3. Strategic clustering results

Using the k-means method and Statistica, the Russian regions were clustered according to the above characteristics into 14 zones (Table 1, Figure 1).

**Table 1.** Zoning of Russian regions based on land resources and property development

Zone	Subjects of the Russian Federation	Zone	Subjects of the Russian Federation
1	Leningrad Region, Nizhny Novgorod Region, Perm Territory, Chelyabinsk Region	8	Ryazan Region, Tambov Region, Republic of Dagestan, Omsk Region, Tomsk Region
2	Rostov Region, Republic of Bashkortostan, Republic of Tatarstan, Samara Region, Sverdlovsk Region, Kemerovo Region	9	Lipetsk region, Astrakhan region Republic of North Ossetia Udmurtia
3	Belgorod Region, Tver Region, Tula Region, Vologda Region, Volgograd Region, Stavropol Territory, Khanty-Mansi Autonomous Area, Altai Krai, Irkutsk Region, Novosibirsk Region, Primorsky Krai	10	Yamalo-Nenets Autonomous District Arkhangelsk Region and Nenets Autonomous Area, Zabaykalsky Krai
4	Vladimir Region, Murmansk Region, Saratov Region, Khabarovsk Krai, Magadan Region and Chukotka Autonomous Region	11	Voronezh region, Ivanovo region, Oryol region, Novgorod region, Pskov region
5	Bryansk region, Kaluga region Kursk region, Orenburg region, Kurgan region, Tyumen region, Republic of Buryatia, Amur region	12	Kostroma Region, Smolensk Region, Chechen Republic, Chuvash Republic, Kirov Region, Penza Region, Kamchatka Territory
6	Moscow, Moscow region, Krasnodar region, Krasnoyarsk region	13	Republic of Karelia, Komi Republic, Republic of Adygea, Republic of Kalmykia, Republic of Ingushetia, Republic of Karachay-Cherkessia, Republic of Mordovia, Republic of Khakassia, Sakhalin Region
7	Yaroslavl Region, Kaliningrad Region, St. Petersburg, Ulyanovsk Region, the Republic of Sakha (Yakutia)	14	Republic of Crimea, Sevastopol, Republic of Kabardino-Balkaria, Republic of Mari El, Republic of Altai, Republic of Tyva, Jewish Autonomous Region

The first zone includes Leningrad, Nizhny Novgorod and Chelyabinsk regions and Perm Krai. These regions are characterized by a significant amount of registered land plots and registered rights (the average seasonal values of these characteristics exceed the average Russian by 30-100%); a high degree of urbanization and industrial development (the share of the average seasonal land area of settlements and industrial and other special purpose lands is 155% and 104% of the average Russian indicators, respectively) and low values of forest land areas and specially protected areas (39% and 19%, respectively); a large number of land plot transactions; a significant cadastral value of land plots, and a significant amount of land taxes. Comparing the composition of this zone with the composition of macro-regions in the Spatial Development Strategy, one can see that Nizhny Novgorod Region and Perm Krai are part of one macro-region. Leningrad and Chelyabinsk Regions belong to a different macroregion.



**Figure 1.** A cartogram of the authors' zoning of the Russian territory

The third zone includes Belgorod, Tver, Tula, Vologda, Volgograd, Irkutsk and Novosibirsk regions, Stavropol, Altai and Primorsky Krai, and the Khanty-Mansi Autonomous District. Among these regions, Tver and Tula ones were referred to macro-region 1, and Novosibirsk region and Altai Krai - to macro-region 11. All other regions belong to different macro-regions, meanwhile the land and property spheres of these regions have much in common: the average Russian amount of land taxes and rental charges; low land market activity; the share of industrial, agricultural and residential land areas is above the average Russian; a high share of state owned land; a high degree of efficiency of the public land control.

None of the zones contains more than two regions falling into the same strategic macro-region; in zones 10 and 14, all regions belong to different macro-regions.

#### 4. Conclusion

The results allow us for conclusions that characteristics of the land and property complex were not taken into account when developing the draft Spatial Development Strategy of Russia and regional strategies. The zoning of Russia carried out by the authors on the basis of land and property characteristics opens up broad opportunities for land management.

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