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Cadastral Valuation Of Agricultural lands In The Context Of Spatial Development Of The Agro-Industrial Complex In Russia

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***Abstract*— Land resources are the spatial and production basis of agriculture. Land use conditions have a great impact on the development of the agro-industrial complex, including in the spatial aspect. Among the economic conditions for land use, the main one is the price of land. The article discusses the impact of the state cadastral valuation of agricultural land on the territorial and sectoral organization of agricultural production. The scheme of mutual influence of the cadastral value of agricultural land and the spatial development of the agro-industrial complex is proposed. The object of the study was agricultural land in the oblasts of the Central Chernozem Economic Region of Russia, which is an old-developed agrarian region in the country. The authors analyzed the dynamics of the agricultural land cadastral value in these areas for 2006-2019. The analysis was carried out for two main segments of the assessment: segment 1 - agricultural land and segment 6 - land under buildings for agricultural production. The authors propose a system of indicators for interregional comparative analysis of the level of cadastral value and land tax burden. The calculation results for the proposed indicators showed a significant differentiation of the levels of cadastral value and taxation in the studied areas, which does not correspond to the differences in the natural, geographical and economic conditions of agricultural production on these territories. The calculated indicator of the land tax burden per 1 ha of agricultural land ranges from 155 to 239 rubles, and per 1000 rubles of agricultural products - from 1.05 to 3.33 rubles. Proposals to improve of the agricultural lands mass appraisal system in the context of their cadastral value as an instrument of state policy for spatial development are formulated.**

Keywords—agro-industrial complex, state support, innovations, innovative development, management mechanism, agriculture.

I. INTRODUCTION

Land resources are the basis for the spatial development of any territory and any sector of the economy. Land resources have particular importance for the agro-industrial complex. The land in this complex is not only spatial basis for the placement of industrial real estate, but also the main resource of agricultural production. Agricultural lands in Russia is the second largest category of lands after forest lands. As of January 1, 2019, agricultural lands is covered by 382.5 million hectares, which is 22.3% of the country's territory [1, c.8]. At the same time, given the special legal status of forest lands as exclusive federal property, agricultural lands is the largest category of lands in economic circulation and subject to taxation [2].

Considering the role and scale of agro-industrial production in the Russian economy, the issues of spatial development of the agro-industrial complex are always in the center of attention of the state and the scientific communities. In publications of Russian scientists for recent years, general problems, trends and mechanisms for improving the territorial-sectoral organization of agro-industrial production have been fully and deeply studied [3-6]. However, the study of the relationship between the spatial development of the agro-industrial complex and the economic ways of land use, including the agricultural land taxation and cadastral value, has not received much attention. In recent years, there has been a growing research interest in world science in models and methods of mass appraisal (cadastral valuation) of real estate, including lands [7]. Spatial data on the location of land and buildings are traditionally considered as the main characteristics for the mass appraisal of real estate [8]. The quantitative spatial characteristics of land plots also include size, azimuth, slope and shape compactness [9]. Given the importance of spatial data for real estate valuation, mass appraisal models based on geographic information technologies and spatial econometrics are becoming more widespread [10]. The results of the spatial development of territories and sectors of the economy (the population size and density, the level of infrastructure development, sales volumes, etc.) are considered as a factors determining the cadastral or market value in the mass appraisal of real estate [11]. But the reverse effect of the cadastral value of land and other real estate on the spatial development of territories and industries has not been sufficiently studied. Even in the context of tax incentives using for spatial development [12, 13], there are no comprehensive studies devoted to land tax and the cadastral value of land as a taxable base. As a result of the reform of the state cadastral valuation system in Russia (2016-2018), the powers to determine the cadastral value of real estate are concentrated at the level of the constituent entities of the Russian Federation, specialized regional institutions have been created [14]. Therefore, the level of cadastral value of agricultural land, along with tax rates and land tax benefits, has a high degree of manageability and can be used as an effective tool for regional agricultural policy. This determines the relevance of research on the relationship between the state cadastral

valuation of land and the spatial development of the agro-industrial complex.

The purpose of the study is to identify and to systematize the directions and mechanisms of the influence of the agricultural lands cadastral value on spatial development of the agro-industrial complex at regional and interregional levels. Our research is also devoted to finding solutions to improve the procedures for state cadastral valuation for using the lands cadastral value in the state policy for spatial development of territories.

II. METHODS

The object of our research is agricultural lands in the Central Chernozem Economic Region of Russia: Belgorod, Voronezh, Kursk, Lipetsk, and Tambov oblasts.

The initial data for the study are:

- legal and methodological acts regulating the state cadastral valuation and land policy;
- reports on the results of the state cadastral valuation of agricultural land plots included in the State Cadastral Valuation Data Fund [15];
- statistical data of the Unified Interdepartmental Information and Statistical System [16];
- statistical data of the Federal Tax Service of Russia on the tax base and the structure of charges for local taxes [17].

The methods of systemic, comparative geographic, retrospective, statistical analysis were used in this study.

Automated processing of data on objects of cadastral valuation was carried out using the software developed by the author (Configuration "Cadastral valuation" based on 1 C: Enterprise, 8.3).

III. MAIN PART

Land management conditions have a direct and considerable impact on the development of the agro-industrial complex, including in the spatial aspect. The most significant is the influence of the natural and climatic characteristics of lands formation (natural soil productivity, agroclimatic potential, relief, etc.), which determine the sectoral specialization of regions, municipalities and specific land uses in agriculture. With the development of agricultural technologies and trade market relations in the agro-industrial complex, the influence of the economic conditions of land management also increases. Among them, the most important role is played the land price of lands as the main indicator of production and a limited natural resource. The land price is reflected in the level of profitability of production, stimulates or inhibits the development of various organizational forms of management, regulates inter-municipal and inter-regional "migration" of agribusiness.

The land price for agricultural enterprises in a broad sense includes not only a one-time payment that they pay to purchase a land plot in ownership (purchase price) or for a long-term lease (price of a lease agreement). Taking into account the principle of payment for land use, established in article 65 of the Land Code of the Russian Federation [18], the land price is also determined by periodic payments in the form of land tax or rent for the state lands. These payments are calculated based on the cadastral value of the lands.

The role of cadastral value in the economy of the agro-industrial complex is not limited to its use only for calculating periodic land payments to the state and municipal budgets. The cadastral value serves as a guideline for sale and purchase of private land in the real estate market. It is used for mortgages on private lands. Also, the cadastral value is used to make decisions on the purchase of lands into state ownership, change the legal status of agricultural lands, etc. The results of generalization of the directions and mechanisms of the relationship between the cadastral value of lands and the spatial development of the agro-industrial complex that we have identified are presented in the diagram (Fig. 1).

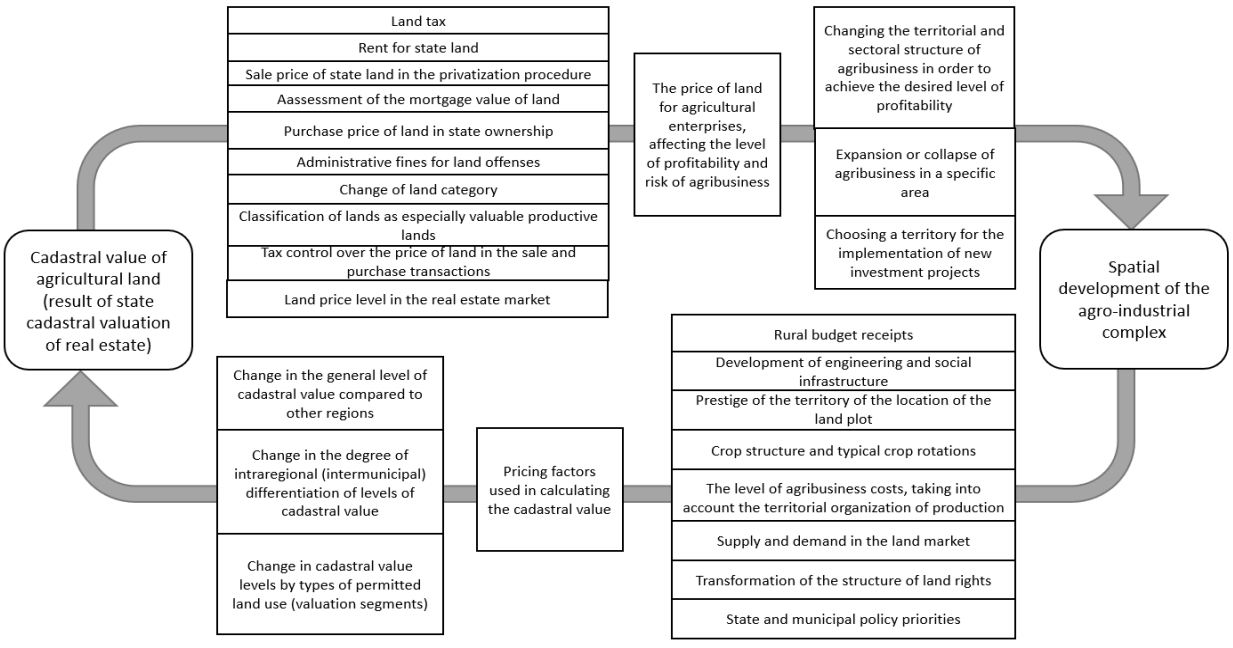

Fig. 1. Scheme of the mutual influence of the cadastral value of agricultural lands and the spatial development of the agro-industrial complex

As of January 1, 2019, the total area of agricultural lands in the Central Chernozem Region was 13.2 million hectares, or 79% of the total territory (Table 1). The largest area of agricultural lands is concentrated in the Voronezh oblast - 4175.6 thousand hectares or 31.54% of the total area of agricultural lands in the Central Chernozem Region. The second largest agricultural land area is the Tambov oblast, which has 2783.3 thousand hectares or 21.03%. The Tambov oblast is also leader in the share of agricultural land in the total area of the region with an indicator of 81%.

The area of productive lands (arable land, fodder land, land under perennial plantations, fallow lands) in the category of agricultural lands on the territory of the Central Chernozem Region is 12.1 million hectares, or 92% of the total area of the category. In addition, productive agricultural lands with an area of 1.1 million hectares is located in settlements.

Private ownership of agricultural lands prevails in the study area. The share of private land in the category of agricultural lands ranges from 51% in the Belgorod oblast to 79% in the Kursk oblast. In total, 9.2 million hectares are privately owned, which is 70% of the total area of agricultural lands.

TABLE I. INFORMATION ON THE AREA OF AGRICULTURAL LAND AND PRODUCTIVE LAND IN THE CENTRAL CHERNOZEM REGION AS OF 01.01.2019

Oblast	Total area of land in the region, thousand ha	Agricultural land (AL) area, thousand ha	Share of AL in the total area of the region,%	The area of productive land in the category of AL, thousand ha	The share of productive land in the total area of AL,%
Belgorod	2713.4	2088.9	77%	1896.8	91%
Voronezh	5221.6	4175.6	80%	3809.5	91%
Kursk	2999.7	2272.2	76%	2097.3	92%
Lipetsk	2404.7	1917.8	80%	1774	93%
Tambov	3446.2	2783.3	81%	2548.2	92%
TOTAL	16785.6	13237.8	79%	12125.8	92%

Agricultural lands do not bring significant income to the regional budgets, although they have a large area and a high share of private property (Table 2). In 2019, on the territory of the Central Chernozem Region, 1.69 billion rubles of land tax was charged on land plots used for agricultural production in the category of agricultural lands and in agricultural zones of settlements. This is only 13.57% of the total land tax. The share of tax on agricultural lands is most significant in the Tambov oblast, where it reaches 27.11% of the total land tax charges. The smallest share in the total amount of land tax is observed in the Belgorod oblast - 5.92%. This can be explained by the large sum of the total land tax in the Belgorod oblast (4.3 billion rubles), which is the leader in this indicator among other oblasts.

TABLE II. INFORMATION ON LAND TAX CHARGES ON LAND PLOTS FOR AGRICULTURAL PRODUCTION IN THE CENTRAL CHERNOZEM REGION FOR 2019

Oblast	Tax revenues, thousand rubles	Land tax, total		Land tax on land for agricultural production (at a rate of 0.3%)	
		thousand rubles	*% of tax revenues*	*thousand rubles*	*3% of land tax*
Belgorod	115 923 424	4 339 484	3.74%	256 995	5.92%
Voronezh	117 713 813	3 538 768	3.01%	541 053	15.29%
Kursk	61 755 265	1 434 214	2.32%	289 688	20.20%
Lipetsk	54 079 593	1 714 077	3.17%	218 216	12.73%
Tambov	28 731 579	1 402 863	4.88%	380 289	27.11%
TOTAL	378 203 674	12 429 406	3.29%	1 686 241	13.57%

There is a contradiction between the low volume of land tax revenues from agricultural land and the economic success of agribusiness in Russia in recent years. Therefore, regional governments set the task of increasing the tax burden on this category of lands. The tool for solving this task is the cadastral value of land, because the marginal tax rate on agricultural lands is fixed at the federal level at a preferential rate of 0.3% and it is not planned to change it.

Of course, replenishment of local budgets by increasing the agricultural lands tax can have a positive impact on the development of rural areas, which is one of the priority tasks of spatial development of the Russian Federation [19]. However, the use of the tool of the cadastral value of land for the regulation of taxation should be very balanced and based on a comprehensive, including interregional, analysis of the economic results of the agro-industrial complex.

The study of the Reports on the results of the state cadastral valuation of agricultural lands in the territory of the Central Chernozem Region showed that a comparative interregional analysis of the levels of cadastral value is not carried out, the indicators of the tax burden are not investigated, and the calculated and actual indicators of income, costs and land rent are not compared. Also, three of the four Reports carried out in 2018-2020 (except for the Kursk oblast) lack a comparative retrospective analysis of the specific cadastral value (SCV). However, in the previous rounds of cadastral valuation (until 2017), a comparative analysis of the SCV of the new and the previous rounds of valuation by comparable assessment groups was

necessarily carried out and included in the text of the Reports. To date, the mandatory requirements for a retrospective and interregional comparative analysis of the levels of cadastral value in the preparation and implementation of mass land valuation are not established by regulatory methodological documents [20].

Interregional analysis of the levels of cadastral value and tax burden is also significantly complicated by the fact that open sources of statistical data do not contain all the necessary indicators. For example, to calculate the indicator of the tax burden per 1 hectare of agricultural lands, information is required on the area of real objects of taxation, which are absent in the form of a statistical report of the Federal Tax Service [17]. Therefore, we used as the denominator in calculating this indicator, the most logically close indicator of the total area of agricultural land in private ownership, according to the Unified Interdepartmental Information and Statistical System [16].

The results of the analysis of the SCV for the two main assessment segments, including productive lands (segment 1) and land plots under agricultural production buildings (segment 6), as well as the land tax burden, showed a significant differentiation in the levels of cadastral value and taxation across the Central Chernozem Region. The revealed differences do not correspond to the objective conditions of agribusiness and the results of the development of agricultural production in these territories (Table 3).

TABLE III. INDICATORS OF THE INTERREGIONAL ANALYSIS OF THE LEVEL OF CADASTRAL VALUE AND LAND TAX BURDEN OF AGRICULTURAL LAND IN THE CENTRAL CHERNOZEM REGION FOR 2019

Oblast	**Land tax per hectare of agricultural lands, rubles**	**Land tax per thousand rubles of agricultural products in general, rubles**	**Land tax per thousand rubles of crop production, rubles**	**Specific cadastral value according to the last round of cadastral valuation, rubles/sq.m**		**Average estimated specific land tax (at a rate of 0.3%), rubles/ha**	
				1 segment (productive lands)	***6 segment (under buildings)***	***1 segment (productive lands)***	***6 segment (under buildings)***
Belgorod	239	1,05	2,84	10,94	32,46	328	974
Voronezh	193	3,16	4,00	5,77	10,07	173	302
Kursk	160	2,03	2,92	4,66	34,13	140	1024
Lipetsk	155	1,89	2,52	5,78	7,53	174	226
Tambov	180	3,33	4,83	5,95	10,23	178	307
TOTAL	183	2,14	3,44	6,43	18,88	193	567

The calculated indicator of the land tax burden per hectare of agricultural lands is highest in the Belgorod oblast, where it reaches 239 rubles/ha. Here we can see the highest SCV of productive lands - 10.94 rubles/sq.m. and the average specific land tax - 328 rubles / ha. According to the results of the last round of cadastral valuation, the growth of the SCV of productive lands (1 segment) in the Belgorod oblast exceeded 1.9 times (Fig. 2).

In the Belgorod oblast, the specific cadastral value of the 6th segment of the assessment is also high - 32.46 rubles/sq.m (an increase of 3.1 times compared to the previous round). The average tax on land plots under the buildings of agricultural production is 974 rubles/ha. According to this indicator, the Belgorod oblast is in second place after the Kursk oblast, where the specific cadastral value of similar lands increased from 5.94 rubles/sq.m. up to 34.13 rubles/sq.m (5.8 times).

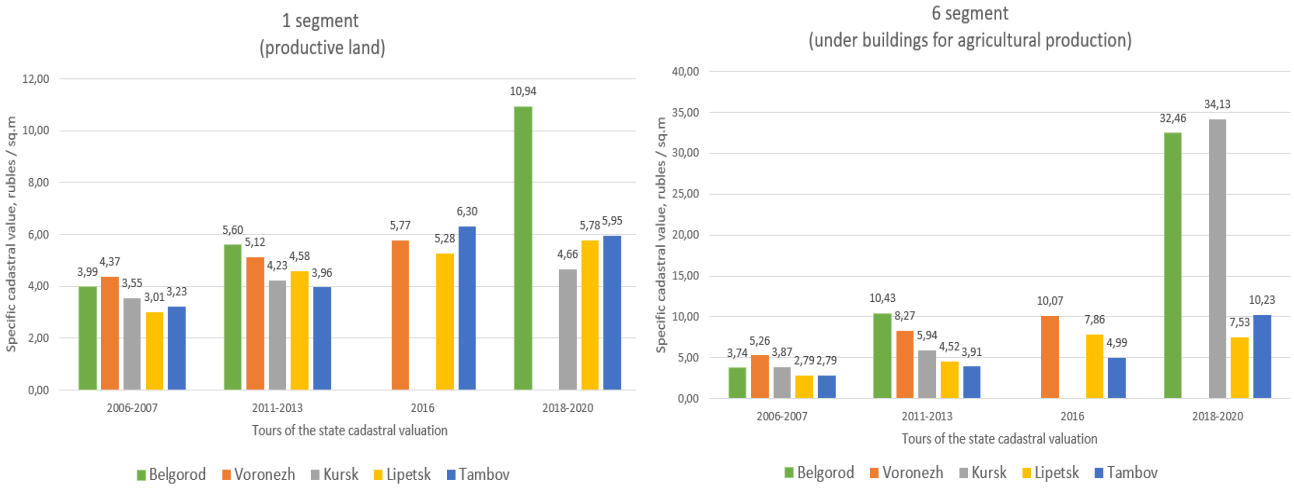

Fig. 2. Dynamics of the specific cadastral value of agricultural lands on the territory of the Central Chernozem Region in 2006-2020

The Belgorod oblast has a high level of cadastral value and tax burden, but the ratio of land tax to agricultural production is lower than in other oblasts of the Central Chernozem Region. This is due to the peculiarity of the structure of property relations for agricultural land in the Belgorod oblast, where significant areas of state property are not taxed. In addition, there is a high level of development of the agro-industrial complex and large volumes of production in animal husbandry. Of course, it would be more objective to analyze the ratio of the total amount of land payments (land tax and rent) to the volume of agricultural production. However, information on the amount of rent to the budget for agricultural land is not contained in open data sources.

Having analyzed in aggregate all the calculated indicators, we see that there is a growth reserve for the cadastral value of productive lands (1 segment) in Lipetsk (5.78 rubles/sq. m), Kursk (4.66 rubles/sq. m) and Voronezh (5.77 rubles/sq.m) oblasts. A significant reserve for an increase in the cadastral value of land plots under buildings for agricultural production (segment 6) is available in Voronezh (10.07 rubles/sq.m), Lipetsk (7.86 rubles / sq.m) and Tambov (10.23 rubles/sq.m) oblasts, where the level of cadastral value of such lands is lower than the neighboring Belgorod and Kursk oblasts by more than 3 times. However, perhaps a relatively low level of cadastral value is specifically supported by regional governments as an instrument of interregional competition for attracting agricultural and industrial investment projects.

IV. CONCLUSION

Thus, the cadastral value of land can serve as an effective mechanism for solving the problems of territorial and sectoral development defined by the Spatial Development Strategy of the Russian Federation [15], including reducing the level of interregional differentiation in socio-economic development and reducing intraregional socio-economic differences, development rural areas.

To increase the efficiency of this tool for spatial development, we have prepared a number of proposals for improving the procedures for the state cadastral valuation of land:

- Development and approval of a system of indicators and methods of interregional and intermunicipal comparative analysis of the levels of the cadastral value of land and the land tax burden;
- Correction of the composition of open statistical indicators of land monitoring and tax reporting to ensure the application of the above methodology of interregional and intermunicipal comparative analysis;
- At the stage of preparation for the state cadastral valuation and at the stage of quality control of the results of determining the cadastral value, an interregional (with neighboring regions close in socio-economic development and natural and climatic conditions) and intermunicipal comparative analyzes of the levels of the cadastral value of land and the land tax burden should be carried out. The comparison results must be included in the text of the Reports on the results of the state cadastral valuation. If the difference in indicators in comparison with other territories exceeds 30%, then the Report should provide detailed explanations (justifications) of the reasons for such a deviation. This requirement must be enshrined in a normative act.
- At the stage of quality control of the results of determining the cadastral value, a retrospective analysis of the levels of the cadastral value must be carried out with the reflection of its results in the Reports. If the increase in the cadastral value in comparison with the previous round of valuation exceeds the inflation rate for the comparable period, then a detailed explanation (justification) of such an increase should be provided. This requirement must also be enshrined in a normative act.
- As part of the Data Fund of the State Cadastral Valuation [15], an open electronic database of indicators of minimum, average, maximum specific indicators of the cadastral value by type and assessment groups of real estate objects in the territorial context should be created. This will automate the comparative and retrospective analyzes of the levels of cadastral value, as well as create the necessary information basis for scientific research in this theme.

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