



## Problematic aspects of land plot cadastral valuation in the "Agricultural use" segment

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### Abstract

The transition to new organizational conditions for cadastral valuation in accordance with the Federal Law No. 237-FL "On State Cadastral Valuation" did not lead to agricultural land assessment improvement, where the main sources of its result inadequacy are imperfection of information and methodological support. According to the results of the 4th round of assessment (2019), within each of the municipal districts of the Saratov region, the specific indicator of the cadastral value of agricultural land is characterized by one value, which does not reflect the existing range of natural and economic factor influence on the efficiency of land use in agricultural production. Such an information resource does not correspond to the very concept of the assessment result and cannot ensure the adequacy of not only land taxation, but also of many other mechanisms of state and municipal land management.

**Keywords:** state cadastral valuation, taxation, land plot, land development, land management, agricultural land, soil fertility

### Introduction

Improving the quality of the state cadastral appraisal (SCA) results regardless of the category (segment) of land plots presupposes the improvement of 1) informational, 2) methodological and 3) organizational support. The adoption of the new Federal Law No. 237-FL "On State Cadastral Valuation" (July 3, 2016) was aimed at organizational support improvement. The innovations in the cadastral valuation are the following:- creation of specialized state budgetary institutions, which determine the cadastral value on an ongoing basis, eliminating the blurring of responsibility boundaries between the customer, the contractor, the appraiser as a member of an appraiser's self-regulatory organization (SRO); - the use of a unified grouping of land plots, regardless of their belonging to the category of designated purpose, established by uniform "Methodological recommendations on the state cadastral valuation" for all objects <sup>[1]</sup>; - regulation of the procedure for preliminary consideration of the draft assessment report and its results, which provides with the possibility of interested parties to indicate the unreliability of the object characteristics at this stage. At the same time, the main sources of inadequacy of the SCA results are the imperfection of information, and methodological support for agricultural lands.

### Materials and Methods

The methods of both individual market and mass cadastral appraisal for the assessment of agricultural land plots,

attributed to the sites of the first group during the 1-3-rd round of assessment, and to the segment "agricultural use" during the 4-th round, provides for the use of an income approach - the method of land rent capitalization. The main rent-forming factor in the use of agricultural land is the level of soil fertility. Adequate results of mass appraisal, taking into account the number of objects from tens to hundreds of thousands in each Federation subject, are possible only if there are characteristics of the land plot quality state in the real estate cadastre. When forming the normative base of the land cadastre in 2000, it was planned to include soil fertility parameters in the main characteristics of agricultural land plots. But until now, not only these parameters, but also the type of land are not included in the characteristics of land plots, now the USRT. The analysis of methods for agricultural land evaluation in foreign countries, carried out in <sup>[2]</sup>, confirmed the predominance of the income approach use, in which the determination of the land productivity is based on the materials of the territory agro-climatic zoning and soil surveys <sup>[3]</sup>. At the same time, a prerequisite is the widespread use of GIS technologies, the development of specialized computer programs that allow evaluators to create their own expert evaluation systems and prepare the maps of land plots with the evaluation results <sup>[4, 6]</sup>. Thanks to computerization, the assessment results become not only an information base for taxation, but also an element of farming system improvement at the national, regional and local levels <sup>[6, 7]</sup>, in the land management system aimed at agricultural production maintaining or expanding, reducing

the level of production risk, and potential natural resource protecting [8].

Methodological guidelines for cadastral valuation of agricultural land in 2010 [9] as well as the latest unified methodological guidelines for cadastral valuation in 2017 [1] must set the parameters of quality characteristics for each land plot based on their soil differences. At the same time, as indicated in [9], "the areas of soil varieties in the composition of a land plot are determined by correlating the boundaries of soil varieties, established on the basis of soil maps, and the boundaries of land plots." This approach has not been implemented over the past 2 rounds of this provision on taking into account the parameters of fertility in the assessment and can hardly be implemented in the future due to its labor intensity and incorrectness when it comes to the land plots of small area.

In the proposed work, the normative grain yield was determined by the method [10] using an adjusted agroecological potential model, which more adequately takes into account the influence of the limiting factor - the lack of moisture supply in the Saratov region [11]. To analyze the problematic aspects of agricultural land cadastral valuation, they used the results of the 4th round in the Saratov region, conducted in 2019 [12]. A detailed analysis of the assessment object distribution by size was made in relation to 2553 land plots of the Engels municipal district of the Saratov region with a total area of 251.3 thousand hectares.

## Results and discussion

The new method of cadastral valuation, taking into account the steady growth of valuation object number, can be implemented only if there are automated databases on the

quality characteristics of lands. And this implies the transition of soil maps existing only in paper form into an electronic format with the establishment of the parameters concerning the normative yield of the estimated crop rotation for each soil difference. The increase of appraisal object number is conditioned by the process of cadastral registration of land plots allocated against the right to a land share. The size of such plots, as a rule, does not exceed 12-15 hectares. Naturally, the plots of this size cannot be an independent object of agricultural production on arable land. In the conditions of the Saratov region, the average size of working plots of arable land exceeds 100, and 200 hectares in Levoberezhye. Accordingly, the result of the economic use of land will be determined not by the soil and technological characteristics of a land plot with an area of 10-15 hectares, formed on account of the right to a land share, and included in the working plot of land, which is the primary spatial resource of an agricultural means of production. The distribution of land plots by size in the Engels municipal district of the Saratov region during the 4th round of cadastral valuation [12] is shown in Table 1.

The data in Table 1 show that the main share of cadastral valuation objects (1861 out of 2553 pieces or about 73%) falls on the land plots with an area of less than 50 hectares, including the plots of less than 20 hectares - 1299 (50.9%). These are, as a rule, the plots allocated against the right to a land share. It should be noted that the process of land share allocation is far from complete. More than 6,000 land shares were provided in total (the Engels municipal district) during the reorganization of collective and state farms, a significant part of which is still the part of the land plots of common ownership (83.6 thousand hectares) used on lease rights by agricultural organizations and farms.

**Table 1:** Distribution of land plots by size

Size of land plots, ha	0-20	20-50	50-100	100-200	200-500	500-1000	>1000	sum
Quantity, pcs	1299	562	288	189	150	34	31	2553
Area, thousand hectares	10,9	18,0	20,1	25,8	45,7	22,8	108,1	251,3
Share from plots in total, %	50,9	22,0	11,3	7,4	5,9	1,3	1,2	100
Share of the area, %	4,4	7,2	8,0	10,3	18,2	9,1	43,0	100

The adoption of our proposed provision - on the individual primary object of assessment in the form of individual land sections is of fundamental importance not only in connection with the possible reduction of object number, requiring a separate calculation of the assessment parameters. In this case, the indicators of the value assessment of a unit area of agricultural land plot will be assigned to all land plots included in it as the objects of law. No less significant is the fact that the State Fund of data obtained as a result of land management contains information on the on-farm assessment of former collective and state farm lands, on the basis of which it is possible to carry out certification of the assessment objects by the parameters of soil fertility level and technological properties.

A prerequisite for the cadastral valuation improvement, and no less important than the development of information support, is the substantiation of the currently not perceived obvious position that the valuation of agricultural land is an independent type of valuation activity. A mass assessment that meets the current level as an economic dimension in the implementation of information technologies for land management involves the development of fundamentally

new models that are not used in the assessment of other real estate objects, and the mastery of such competencies by the appraisers themselves, which are not provided for by the standards of the existing specialized education:

- Sufficiently in-depth knowledge of the economic and technological aspects of land use in agricultural production, without which it is impossible to build a model of costs for the production of individual crops and the use of different lands [13];
- Modeling the magnitude of production risks of rental income receiving in the system of existing weather and price risks, modeling the mechanisms of their inclusion in cost determination [14];
- Interpretation of soil survey materials to construct a model of agricultural production characteristics (land productivity) of an object as a means of production, with which both the use costs and the costs of soil fertility reproduction are associated, the calculation model for which is currently absent [13].

A demonstration of problematic aspects (informational, methodological and organizational) manifestation of the cadastral assessment are the results of the 4th round of

agricultural land in the Saratov region, conducted in 2019 [12]. There can be no question of any compliance of its results with the requirements of the methodology to determine the cadastral value [1] and the presentation of the cadastral valuation results [15]. The specific indicator of the cadastral value (SICV) of land plots in segment 1 - "agricultural use" is represented by two universal values within all municipal districts of the region, one for the type of permitted use "for the placement of fisheries facilities", the second for all the rest land plots of the municipal district, consisting of agricultural land.

To demonstrate the importance of special knowledge factor about land as a means of production in its cost assessment, it is applicable to compare the results of the cadastral assessment of the first and second rounds carried out by the workers of former drylands who do not have appraiser's certificates, but who have knowledge and information about the qualitative characteristics of agricultural land, with the results of the 3rd and the 4th round conducted by specialized appraisal organizations. In the first rounds, within each municipal district, based on the diversity of soil fertility level and the transport accessibility of assessment objects, more than 200 different values of the SICV were identified. In the third round, their number decreased to 10-12 individual values, and in the 4th round, conducted by a specialized budgetary institution, they reduced to one value with respect to agricultural land plots.

The appendix to the report containing the values of the cadastral value of the appraisal objects, must have the information on the characteristics of the real estate objects used in their cadastral value determination. Issuing one value of the SICV per district, and following the requirements for the cadastral assessment result presentation [15], the performers had to show the same parameters of fertility and transport accessibility for all land plots.

The cadastral value, which is the only value for the district, is very doubtful, as it characterizes the average parameters

of soil fertility for the municipal district. Using the average values of soil fertility indicator in the districts and transport accessibility, determined during the first round of cadastral assessment (2000), the values of the SICV were determined in accordance with the requirements of the assessment methodology [1]. The parameters of the selling prices of crops and the capitalization coefficient of land rent, given in the report [12], were taken in the calculations. The ratio of SICV values calculated according to the methodology requirements presented in the report is shown on the figure. SICV values calculated according to the methodology [1], have a functional relationship with the normative grain yield ( $Y_n$ ), described by a polynomial dependence with the parameter of the relationship reliability  $R^2 = 0.9888$  (figure).

As for the districts of the Levoberezhye of the Saratov region with a standard grain yield below 2.0 t/ha, the values of SICV according to the results of the cadastral assessment are 60-100% higher than those obtained when the requirements of the assessment method are met. At the same time, the values given in the report are underestimated for the areas with a high level of agro-resource potential (north-western regions of the Pravoberezhye), where the standard yield exceeds 3.0 t/ha. In particular, for the Balashovsky district by 19.6%, and Kalininsky by 32.2%.

One value of the specific indicator of agricultural land plot cadastral value for the municipal district, submitted for approval, indicates the absence of the very fact of the assessment work. Obviously, such an information resource cannot ensure the adequacy of taxation, and also many other mechanisms of state and municipal land management [16-18]. One of them is the identification of especially valuable productive agricultural land, the criterion indicator for which is the excess of the plot SICV by 50% of its average size for the region.

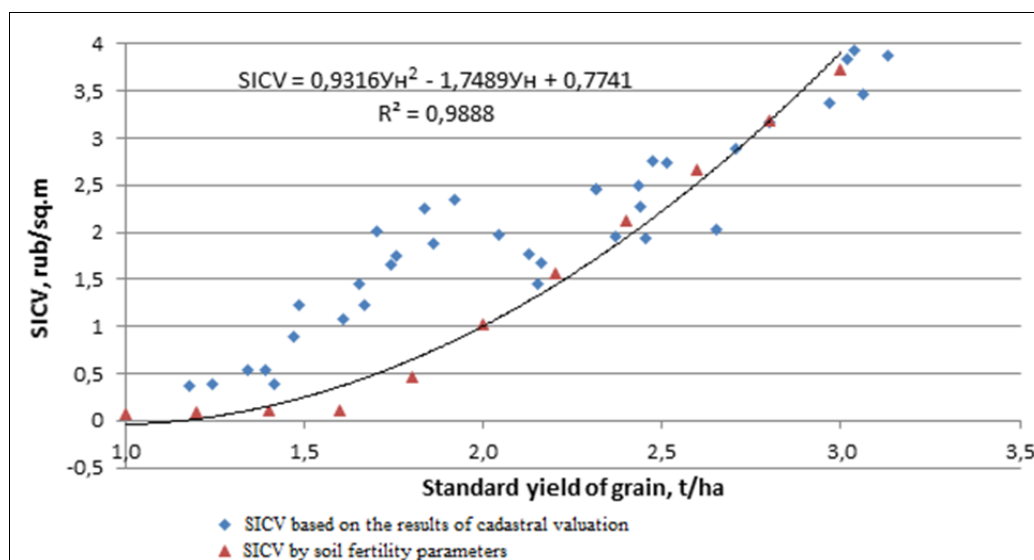


Fig 1: The ratio of the specific indicator of the cadastral value (SICV) and the normative grain yield ( $Y_n$ )

### Summary

In accordance with the Federal Law No. 237-FL "On State Cadastral Valuation" the transition to new organizational conditions for cadastral valuation did not lead to agricultural land valuation quality improvement, where the main sources

of inadequacy of its results are imperfection of information and methodological support.

They substantiated the provisions of giving the status of an independent type of valuation activity to the assessment of agricultural land. Due to the specifics of objects

(agricultural land), their assessment involves the development of fundamentally new models that are not used in the assessment of other real estate objects, and the mastery of competencies by the appraisers, which are not provided for by the current standards of basic specialized education and additional one.

A prerequisite for an adequate assessment is the widespread use of GIS technologies for the interpretation of soil survey materials, modeling the productivity of lands, which are associated with the costs of their use and the reproduction of soil fertility, the calculation models for which are absent currently. The assessment results become not only an information base for taxation, but also a tool for farming system improvement aimed at agricultural production maintaining or expansion, production risk level reduction, and natural resource potential protection.

A new approach has been substantiated to establish the primary object of certification by qualitative characteristics in the form of individual agricultural land working areas, which are of fundamental importance in connection with:

- The increasing share (up to 70 and more percent) in the assessed plots allocated on account of the right to a land share less than 20 hectares and not being an object of independent agricultural production;
- The possibility of using the stock materials of Rosreestr, obtained as the result of on-farm appraisal, to carry out certification of appraisal objects according to the parameters of soil fertility level and technological properties.

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