Analysis of the use of agricultural land in the SPK kolkhoz-plemzavod "Russia" with the use of GIS technologies

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Abstract. The article considers the use of the land fund on the basis of the data bank and inventory of land of the MO village of Manychsky Apanasenkovsky district of the Stavropol territory with the use of GIS technologies. The analysis was made based on data taken from the data bank for 1994, as well as on the materials of the inventory of agricultural land for 2018. According to the results of the work, land plots that have not passed the state cadastral registration were identified, which in turn are used. This information is not a little important because such land is not taxed, which affects the revenue part of the authorities. The issue of land use in the context of property was also considered. The article provides a comparative analysis of land use between 1994 and 2008.

1. Introduction
The creation of a land data bank aims to automate the maintenance of land records for a certain territory and the preparation of a report on the availability of land and their distribution by category, landowners and land users.

In turn, the inventory is carried out if the title documents for the land plots are missing, or are incomplete, or partially incomplete, the land plots do not correspond to their actual location and area, as well as if the rightholder of the land plots has changed. When reorganizing a legal entity, an inventory is required for drawing up a division balance sheet or an accession agreement.

The materials of the land inventory approved in accordance with the established procedure are the basis for drawing up valid documents of title, approving and fixing the boundaries of land plots on the ground, conducting land surveying and further passing the state cadastral registration.

To ensure the inventory of land, preparatory and field work is carried out to collect and analyze the available legal documents, aerial photography, topographic and geodetic, cartographic materials, and other surveys and studies.

As a result of the land inventory, reliable data on the use of land, its condition, as well as land ownership should be obtained.

Land inventory in the Russian Federation is regulated by Federal Law No. 78-FZ of June 18, 2001 "On Land Management" [1].

The course of the land inventory is largely determined by the initial data, i.e. maps, graphic, text documents, legal documents, materials of previous inventories, topographic plans and maps of cities.
2. Analysis of land fund data
One of the most common methods of geographical study of rural areas is the functional approach, which allows us to identify the set of main purposes of this territory based on the analysis of the nature of land use and the features of its transformation [2].

The source information for the data bank is taken from the invoice-by-invoice list of area calculations or graphical accounting materials. Data is entered for each contour, indicating its number and the section to which it belongs, the type of land, area, and belonging to a specific land user. (figure 1).

![Figure 1. Map of graphical accounting of on-farm land management.](image)

On the map of on-farm land management are indicated:

1. placement of production units and economic centers (including the solution of issues of establishing the composition and size of divisions, placement of economic centers, land plots, production units, as well as specialization and development of agricultural production);
2. placement of on-farm roads and other engineering structures, general economic objects, engineering equipment of the territory;
3. organization and placement of land and crop rotations;
4. arrangement of the territory of crop rotations (establishment of types, types, number and area of crop rotations; placement of crop rotation massifs and their assignment to subdivisions; crop rotation fields and working areas; protective forest strips; field roads; field camps and water supply sources);
5. arrangement of the territory of hayfields and pastures (fixing pastures to farms and groups of livestock; organization of pasture rotations, placement of paddocks; summer).
As a result of the analysis of the state of the land fund, the obtained and updated indicators and characteristics of the land fund for 1994 and 2018 were compared.

**Table 1. Land explication for the year 1994.**

| Name of the land       | Area (ha) |
|------------------------|-----------|
| Arable land            | 20190     |
| Perennial plantings    | 104       |
| Pastures               | 9866      |
| Water Fund             | 398       |
| Other                  | 358       |
| **Total**              | **30916** |

Analyzing the table, we can say that the main part of the territory is occupied by land under arable land 64% of the total area, as well as a significant part is pasture 31% of the remaining territories occupy less than 1% (table 1).

As part of the inventory of agricultural land, it is necessary to collect information about the land plots that have been registered and put on the state cadastral register, respectively, cadastral plans of the territory were ordered. The information provided is also necessary to clarify the list of all available land plots within the boundaries of the municipality. To do this, you need to make a list of all cadastral blocks on the territory of which these land plots are located. Boundaries of cadastral blocks of a municipality (figure 2).

**Figure 2.** Map of the cadastral division and the boundaries of the study area.
Cartographic materials at the present stage of the development of society are not only the final stage of a particular study, but also the material for further scientific and organizational work [3].

At the first stage, work is being carried out to identify the land information about which is included in the state real estate cadastre, as well as to establish information in the context of property (figure 3).

![Figure 3. Map of identification of land plots that are not on the state cadastral register.](image)

As part of the analysis, agricultural land that is not on the state cadastral register is only 512 hectares of the total area. According to this information, a scheme and an explication of land in the context of property was prepared. The schematic materials indicate the current and accurate data for each land plot in the form of the land user and the area (figure 4).

This information will allow for a more detailed analysis of land use in order to effectively manage land resources, and also contributes to the solution of problems related to the selection and acquisition of land for the implementation of improving the economic efficiency of agricultural land use and participation in profitable investment projects [4].
Table 2. Explication of land by form of ownership.

| Name of ownership forms          | Area. (ha) |
|----------------------------------|------------|
| Private property                 | 2104       |
| Land for rent                    | 3063       |
| Land administration              | 702        |
| Collective shared ownership      | 871        |
| Collective farm land             | 23577      |

When analyzing the bundle of land ownership rights, the institutional methodology allows us to consider the interaction of property rights with the system of incentives and economic behavior, to identify the degree of influence of various structures of property rights on the system of incentives of the agent of economic activity. Ultimately, the system and forms of land ownership determine the system of incentives and the effect of its impact on the results of economic activity in a particular way of management [5].

According to the information obtained as a result of the definition of ownership, it can be said that most of the land belongs to the SEC collective farm-breeding plant "Russia" and is 78%, the land in lease and private ownership is 10% and 7%, respectively, the smallest share in the distribution of property is shared collectively by 3% and the land of the administration 2% (table 2).

The definition of property rights also carries the necessary information as a clarification of information about access to the object of property. The composition and structure of possible obstacles to unauthorized access to a particular property object are determined in the course of a procedure called the specification of property rights. The specification of property rights reduces uncertainty by clearly establishing the following parameters: who, with what object, what exactly, under what conditions and restrictions can freely do, and which guarantor or guarantors will prevent other entities from interfering in the exercise of their right by this entity [6].
Further, as a result of the work on the inventory of agricultural land in the border SPK kolkhoz-plemzavod Russia the analysis of the received updated indicators and characteristics of the land fund was carried out.

Table 3. Land explication for 2018.

| Name of the land       | Area. (ha) |
|------------------------|------------|
| Arable land            | 22853      |
| Perennial plantings    | 60         |
| Pastures               | 7305       |
| Water Fund             | 398        |
| Other                  | 300        |
| Total                  | 30916      |

As a result of the analysis of land use data, perennial plantings were changed in the direction of decreasing by 42% and will amount to 60 ha., other lands also decreased by 58 ha, which will amount to 16% (table 3).

Analyzing the final data of the land fund, it is impossible not to note the changes in the area of pastures in the direction of increasing the land occupied by arable land by 13%. These changes occurred as a result of the fact that the plowing of pastures is a change in the type of agricultural land, for which the norms of the current legislation do not provide for administrative responsibility. It should be noted that a change in the type of agricultural land is not a change in the intended use of the land plot. Consequently, it is not possible to bring to administrative responsibility within the framework of state land supervision.

It is worth noting that there was a bill regulating the conduct of territorial zoning instead of dividing land into categories which was rejected which was later rejected [7]. If we turn to the text of the draft law, we can identify certain positive aspects of it. For example, it regulates in sufficient detail the issue of dividing agricultural land into particularly valuable land subject to special protection and other agricultural land [8].

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