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Order And Methodology For Determining Administrative-Territorial Borders Based On Digital Technologies

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ABSTRACT

The article provides brief information on the procedure and methods of using digital technologies in determining administrative-territorial boundaries, as well as on the process of processing the results obtained using digital technologies, geodetic measuring instruments using special computer programs and cartographic methods of digital administrative control.

KEYWORDS

Digital technology, demarcation, electronic taximeter, GPS receiver, ArcGIS software, coordinates, bitmap and digital electronic map.

INTRODUCTION

Today, the use of innovative technologies in production, services and in many other areas is an integral part of their activities. In particular, the use of innovative technologies in the system of geodesy, cartography and cadastre, i.e. the need to periodically replace obsolete technologies. The quality and speed of obtaining land cadastral information are important in organizing the rational and efficient use of the country's land resources.

The accuracy of land registry data is usually indicated in terms of the legal, natural and economic status of the land in the land registry

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in cartographic materials, plans and text documents. Today, there are thousands of violations of land legislation, various disputes, inaccuracies and mistrust in land information, arbitrary occupation of land by land users. One of the main reasons for this is the uncertainty of the boundaries of land plots. The Land Code on the boundaries of land plots states that it is necessary to establish the boundaries of land plots.

However, the main boundary markers of land plots assigned to all land users operating in the country today, as well as regional, city, local citizens' gatherings and boundary markers of land plots are practically not enough. This, in turn, testifies to the relevance of the use of digital technologies in determining the boundaries of administrative-territorial units.

In order to eliminate these shortcomings, the Resolution of the Cabinet of Ministers No. 299 of April 23, 2018 was adopted [2].

OBJECT OF STUDY

The object of the study is the boundaries of administrative-territorial units and land types in the Kushtepa district of the Fergana region. Creation of digital electronic maps of the territory by defining the boundaries of administrative-territorial units, the introduction of digital technologies in the inventory of land resources.

RESEARCH STYLE

Study of existing documents and maps of inter-farm land management, acquaintance with the methods of delimiting administrative-territorial units in foreign countries, the introduction of methods for creating digital maps using innovative technologies.

RESEARCH RESULTS AND DISCUSSION

Many scientists in their scientific works express different views on the procedure for determining the administrative-territorial boundaries. In particular, according to one of the leading scientists of the country S. Avezbayev, the need for land management within the administrative district was fully realized at the end of the 60s of the twentieth century and began to be introduced into the practice of land management.

In addition to land management in administrative districts, the boundaries of districts have been clarified. At the same time, all categories of land and types of land in the region are identified and reflected on the maps.

At the same time, leading foreign scientists A.G. Granber in their scientific works emphasize the need to divide regions into regions, since they differ from each other in different cases and areas. In terms of integrity, the constituent elements of the region are known regions, which are characterized by interdependence, the division of the country's territory into regions - zoning [5].

E.I. Sorokina and G.Yu. Nimgirova noted in their works that the task of forming the boundaries of administrative-territorial entities is especially important in land management, since borders play a key spatial role in organizing the territory of the state [6].

Our research was carried out in the Kushtepe district of the Fergana region, the territory of which is bordered by 4 districts and 1 city. The region consists of

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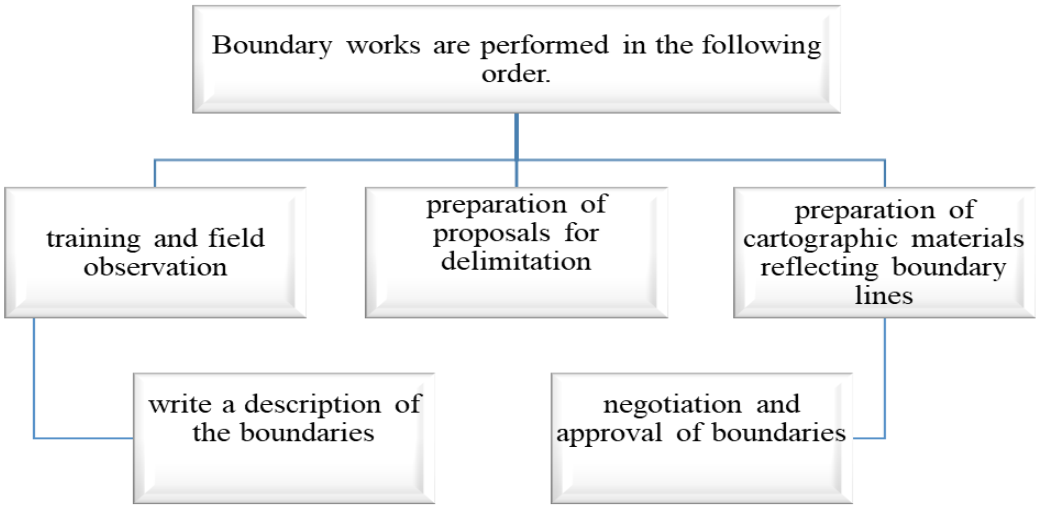
20 villages and 14 cities. In the course of the study, the ways of using digital technologies in determining the administrative-territorial boundaries of the district were considered. In the course of the research, the following works are carried out:



During the preparatory and field surveys, cartographic materials related to the territory were analysed and boundaries were determined, and on the basis of these data, work was carried out to determine the boundaries using modern geodetic measuring instruments.

Figure 1. Field survey work in the Kushtepa district.

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As a result of processing the obtained data with the help of computer programs, digital maps of administrative-territorial boundaries are created. [16,17,18]

This work will be carried out on the basis of the ArsGIS Geoinformation System Technology program and will consist of the following stages:

1. Preparation of raw materials and data entry into the computer memory:

   1.1 from sensors of an electronic taximeter;

   1.2 GPS receivers;

   1.3 through the image processing system;

   1.4 from the available cartographic materials;

   1.5 consists of scanning the source material and converting the resulting raster image to the same unit of measurement.

2. Create and edit map layers and linked tables, and create a database.
3. Enter the classification, tabular and text information about the object.
4. Select methods for creating images for the map.
5. Overlay of layers, development and editing of thematic content of the map.
6. Develop a map layout and create a hard copy.
7. Print the map.

Raster data was used throughout the study. Pixels are used as the unit of measure for raster data. The difference between raster data and a vector is that only one corner of the raster must be associated with an absolute system (for example, coordinates such as distance and latitude, or other coordinate systems); all other pixels are positioned relative to the associated pixel.[14,15,16]

Registration of the image (photo) of the map of the administrative-territorial boundaries of the Kushtepa district of the Fergana region by coordinates in the ArcGIS program.

1. ArcMap is up and running.
2. Koshtepa was connected according to the known coordinates of the raster jpg-map of the region (see Figure 2).

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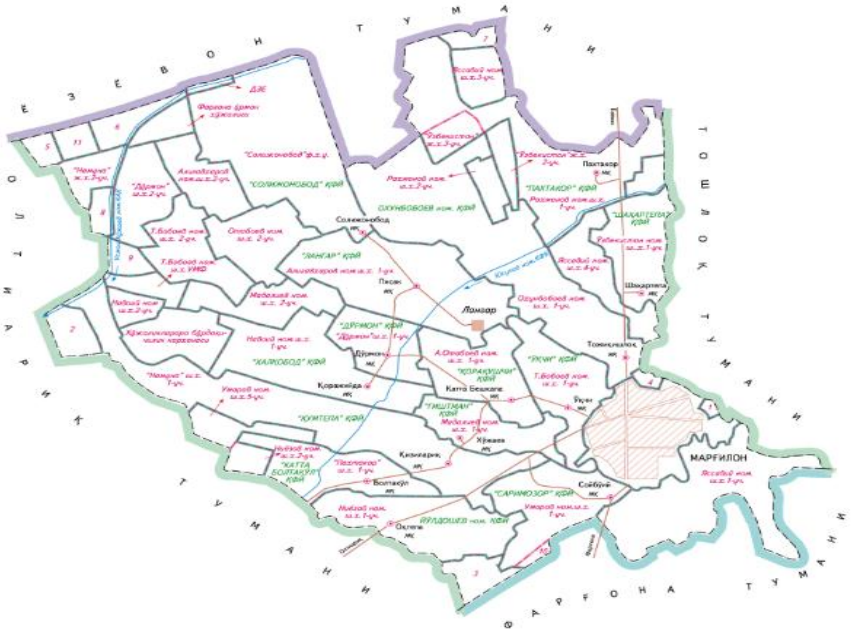


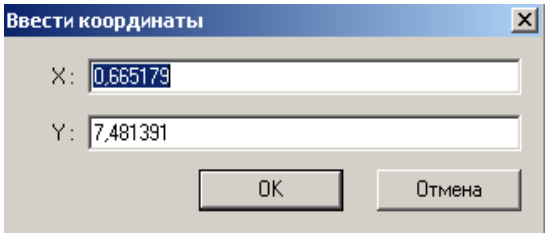
Figure 2. Jpg raster map of Kushtepa district.

When adding a raster to the project management table, reference points are entered using the "Add base points" button on the "Georeferencing" panel (see Figure 3).

Figure 3. Base points

When you enlarge the raster, making the position of the base point on the map more visible, starting from the upper left corner, base points are added in turn, and the coordinates of these base points are entered.

Add base points from the Spatial Reference toolbar. Click the (Add control points)  button, move the mouse pointer to the base point on the map and press the left button. When the pointer changes color, the right mouse button is pressed without moving the mouse. In the context menu> Inbound X and Y (Inbound X and Y) (Inbound X and Y)> Enter coordinates> Click OK (see Figure 4)



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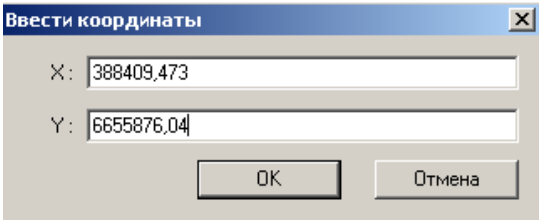

Figure 4. Enter coordinates

After entering the first coordinates, the raster will disappear from the screen. In such cases, the "Full Expansion" button is pressed or the "Layer Scale" operation is performed from the context menu of the layer (see Figure 5).

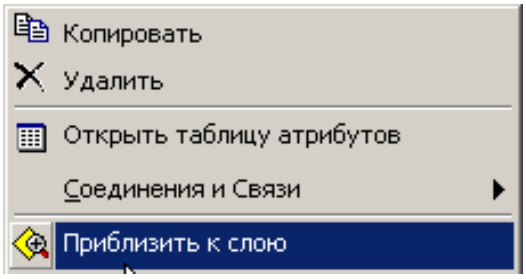

Figure 5. Zoom in

In this way, the remaining coordinates of the control points are entered. Then the connection table (Link table) is opened and errors in the raster connection are checked. ArcGIS then uses the software to develop a GIS map based on the latest database data in that view.

Symbols (legends) are created for electronic digital maps made with the program. Based on the method of creating maps and the selected cartographic method, a conventional map symbol can be created semi-automatically [9]. When using electronic digital agricultural maps, comparison by type of agriculture is possible.

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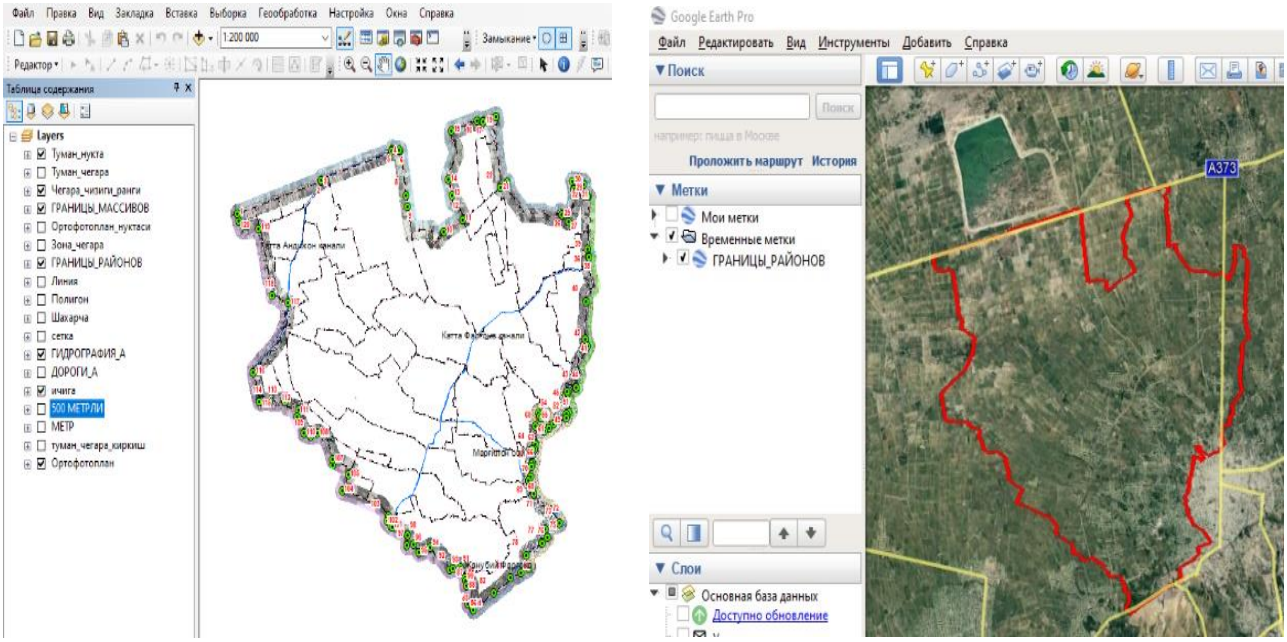

Figure 6. Digital map of the administrative-territorial boundaries of the Koshtepa district based on digital technologies

Output. From the above, we can conclude that the use of digital technologies in determining the boundaries of administrative-territorial units and the use of innovative technologies in land management is characterized by its effectiveness. With the help of digital technologies, it is possible to convert raster data into digital and process the results obtained using geodetic measuring instruments using special computer programs, as well as create maps depicting digital administrative boundaries. This allows you to obtain information on administrative-territorial boundaries and land plots, as well as information on the borders of villages and their location.

SUGGESTIONS AND RECOMMENDATIONS:

1. With the help of digital technologies, the possibilities of creating orthophotomaps and electronic digital maps of regions will be increased;
2. Clarification of territorial boundaries, creation of electronic digital maps of boundaries;
3. The formation of a database of land users will be achieved;
4. Allows you to constantly monitor changes in land areas;
5. The use of innovative technologies allows you to create digital maps with unique contours on various topics in agriculture.

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