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THE USE OF GIS TECHNOLOGY IN RECORDING AND CREATING A DATABASE OF AGRICULTURAL LAND IN BULUNGUR DISTRICT

Umarov Nurali Shermatovich,
Senior Lecturers of Samarkand State Institute of Architecture and Construction

Yarkulov Zokir Ramonovich
Senior Lecturers of Samarkand State Institute of Architecture and Construction

Abstract
The article discusses the use of the database. Currently, as a result of the cadastral database, the focus is on implementing these processes with technical tools equipped with special software capable of creating, storing, updating and, if necessary, analysing and processing the data collected.

Keywords. Cadastre, land categories, monitoring, cadastre, land registry, GIS, scale, plan, electronic map, digital map, coordinate system.

One of the most important issues in the country today is the maintenance of the state cadastre based on GIS technology and the creation of a database. Therefore, the first step in the formation and implementation of the cadastral survey should be to form a GIS database, this section focuses on the use of GIS technology in forming the database.

Data are a crucial factor in the effective management and maintenance of all state inventories in carrying out their functions. In this research, the processes of creating the state land cadastre database, data collection, data management, updating and dissemination are carried out in special programmes.

The study has shown that one of the most important issues is to establish a database in order to record and manage agricultural land and to obtain accurate and reliable information. To this end, Bulungur district of Samarkand province is seeking to create a database on agricultural land types and to explore the possibility of using GIS technology in land records. In conducting the study, land records were based on generally accepted standard methodologies, and the database was created using programmes belonging to the GIS family of programmes, which are widely used today. Currently, each country uses a specific programme to set up its own national geographic information system. Among these programmes, the GIS is one of the

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world's leading ones. This programme was developed by ESRI in the USA. The company has developed several generations of the programme. The company created the first generation of ArcGIS software in 1993 as an add-on to the ArcInfo system. This programme is designed for mass users. One can use this software to create mapping data on a variety of topics and to analyse and describe the resulting data.

A database is a generalised set of data that reflects the state of an object, its properties and its interaction with other objects, as well as the set of hardware and software tools needed to support that database.

The following process was emphasised in the formation of the database and the identification of the required data:

spatial data indicating the location of cadastral objects, i.e. based on a coordinate system, etc;

determine the quantity and quality of the cadastral objects (attribute data);

define the mutual integration of spatial and attributive data;

input and processing of data presented in computer memory, using map numbering to represent coordinates;

a great deal of attention is also paid to integrating the database created into Google Earth.

The study revealed the need to separate the land registry database into two parts. The first part dealt with the available land resources in the district and their level of use. This section reflects the existing land holdings in the region, the state of their use in various sectors of the economy, including agriculture, crop types, yields, soil assessments and other information. The second part focused on legal information on land use. According to this database, as of 1 January 2019, the area of arable land in the district was 28,137 hectares. Of this, 15,637 hectares are irrigated lands, and 12,500 hectares are arable lands. The area of perennial forests in the district is 8357 ha, of which 2191 ha are orchards, 2278 ha are vineyards and the remaining 888 ha are mulberry groves. The database also details the use of irrigated arable land in the district. Also included in the database is the level of use of irrigated land in the district over the past 3 years, the area sown, the change in sown area, and the planned area of crops to be sown in 2020.

It is important for our country to study the land used for agriculture from this category of land, to get full information about it and to plan properly.

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Proper and sustainable use of existing land is essential to control the productivity of agricultural land used in the country, to increase crop yields, to produce abundant and high quality products with low labour costs, and to develop an economically viable, scientifically sound agricultural system. It is important to keep track of available land resources. Because the results of land accounting play an important role in determining the production and demand for it in agriculture.

The formation of a database based on the results of land accounting is currently important in maintaining the state land cadastre system. Based on the above, in the study we found it necessary to study the possibility of using GIS technology in the formation and maintenance of a database of agricultural land in Bulungur district of Samarkand region, as well as the use of programs that exchange information with GIS programs.

As a result of the work done, land accounting issues are shaped on the basis of generally accepted standard methodologies. Existing maps and plans, certificates of acceptance of completed works and information on land surveying were used to account for the existing land stock in Bulungur district. The database of agricultural lands in the district was formed for cadastral purposes and generalized in GIS programs.

Land registry data were collected on the basis of the country's uniform land registry methodology. This is due to the fact that the land categories in question provide a comparison of data from surveys conducted on existing land plots in different regions of the country. For this purpose, a unified system for obtaining, processing and grouping land registry data in the classification of land types by a single method is used.

The distribution of the existing land fund of Bulungur district by land category is shown in Table 1. It follows from the table that as of January 1, 2020, of the 75,197 hectares of land in the region, 69,985 hectares are assigned to agricultural enterprises, of which 53,728 hectares are land plots used in agricultural areas.

The use of modern geographic information systems (GIS) is now important in keeping records of existing agricultural land types. Today, as in the rest of the world, the GIS system is widely used in land records in our country. The issues collected and the data collected form the basis of the land cadastre database.

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Table 1 Distribution of land fund of Bulungur district by land categories (As of January 1, 2020)

T/p	Land categories	Total area	
		thousand. ga.	%
1	Land owned by agricultural companies	69985	93,1
2	Area of housing estates	920	1,2
3	Lands allocated for industrial transport, communications, defense and other purposes	1195	1,6
4	Forest fund lands	275	0,4
5	Water fund lands	2237	3,0
6	Lands intended for nature protection, health, recreation	-	-
7	Lands of historical and cultural significance	-	-
	State reserve lands	585	0,8
	Total lands	75197	100

The first part of the database focuses on the available land resources in Bulungur district and their level of use. In other words, the existing land holdings of the district, the state of their use in various sectors of the economy, including agriculture, crop types, yields, soil assessment scores and other information have been generated (figure 1).

The database provides detailed information on the land and use of agricultural enterprises operating in the district. Data on the distribution of 53,728 hectares of agricultural land currently available in the district by land type are reflected in the compiled database.

Data on the distribution status of land types in the district where the base is located are given in Table 2. According to the table, as of 1 January 2019, the area of arable land in the district is 28,137 hectares. Of these, 15,637 hectares of irrigated land, 12,500 hectares are land with Lalmikor agricultur. The area of perennial plantations in the district is 8357 hectares, of which 2191 hectares are orchards and 2278 hectares are vineyards, and the remaining 888 hectares are mulberry groves.

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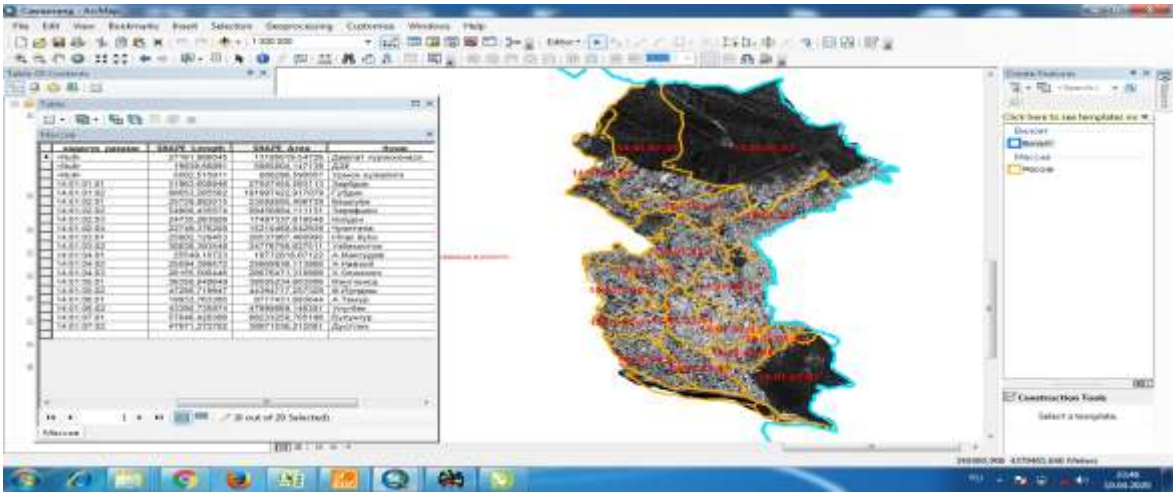

Figure 1. View a structured database on the status of the existing land stock in the district.

The database also focuses on the distribution of available irrigated and non-irrigated arable land by mass as well as productivity levels. The map reflects land survey data on agricultural land in Bulungur district (Figure 2).

Information on the current state of agricultural land in Bulungur district is also included in the database.

It includes the level of use of irrigated land in the district over the past 3 years, as well as the planned crop area for 2020.

Table 2 Clarification of agricultural land in Bulungur district of Samarkand province (As of January 1, 2021)

т/р	Types of land, name	Area, ga
1	**Total agricultural land types**	**53730-53728**
	Including	
2	**Cultivated lands**	**28137**
	From that	
	Irrigated	15637
	Lalmi	12500
3	**Perennial trees**	**8357**
	From that	
	Gardens	5191
	Vineyards	2278
	Mulberries	888
	Fruit trees and other trees	-
4	Gray lands	**96**
5	Pastures	**17140**

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Data on crops grown on existing agricultural land in the district are shown in Table According to the table, the total area under agricultural crops in Bulungur district in 2018 was 19,558 hectares, and in 2019 it was 19,509 hectares, or a decrease of 49 hectares

During these years, the area under cereals and legumes in the district decreased from 9854 hectares to 9177 hectares or 677 hectares. The data from the table show that the area under potatoes and food crops has increased in the district in recent years.

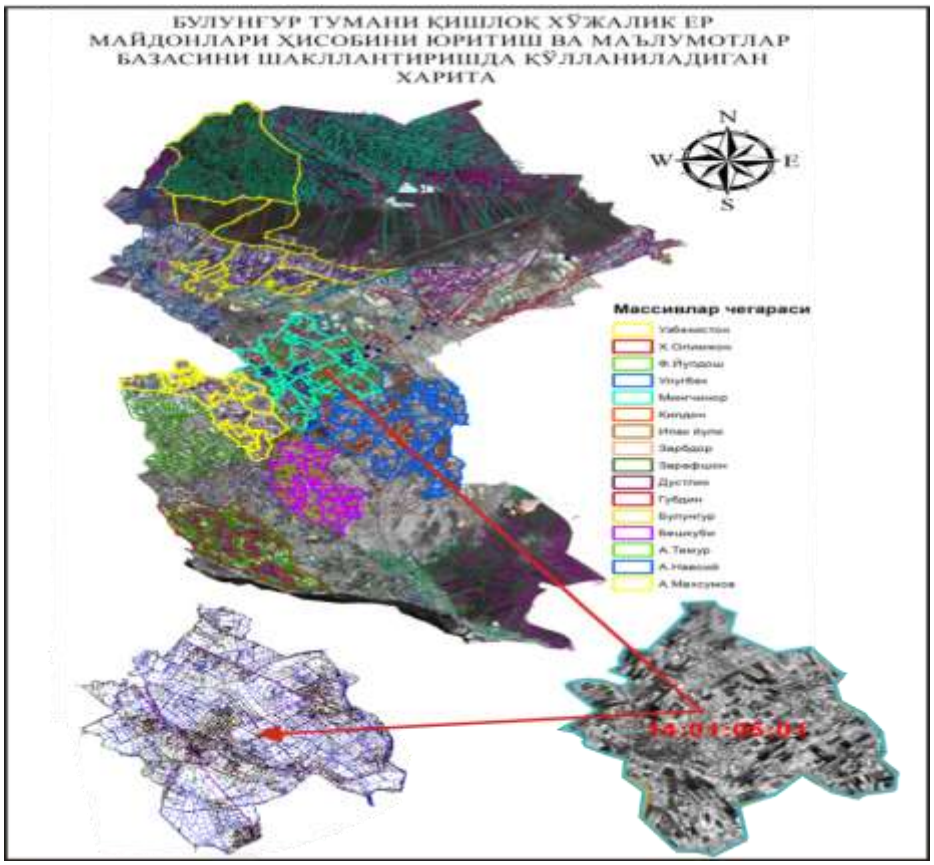

Figure 2. District map based on the collected data

In general, in the formation of the database, data on all types of agricultural land in the district were included separately. The database also focuses on the use of irrigated land belonging to farms in the district. This created database will provide specialists and landowners with convenient access to land use and planning Figure 3.

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Table 3 Cultivation of agricultural crops in the district, ha

т/р	Crop types	Майдони, га		
		2019.	2020.	Ўсиш суръати, %
1	Area planted with agricultural crops, total	19558	19509	99,7
2	Cereals and legumes, total	9854	9177	93,1
3	Hence the cereal crops	9485	9103	96,0
4	Hence the wheat	9236	9056	98,0
5	Barley	249	48	19,1
6	For corn grains	138	70	50,7
7	Legumes	231	4	1,8
8	Technical crops, total	300	276	92,0
9	Oilseeds, total	300	276	92,0
10	Potatoes	2140	3286	153,5
11	Vegetables, total	6355	5673	89,3
12	Melons, total	233	226	96,8
13	Fodder crops, total	676	871	128,8
14	Fruit and berry area, total	6456	5172	80,1
15	Vineyard area, total	6114	3190	52,2

The database also provides information on the status of land use by farms operating in the district. Creating a database is one of the most important issues in the accounting and analysis of the productivity of irrigated lands.

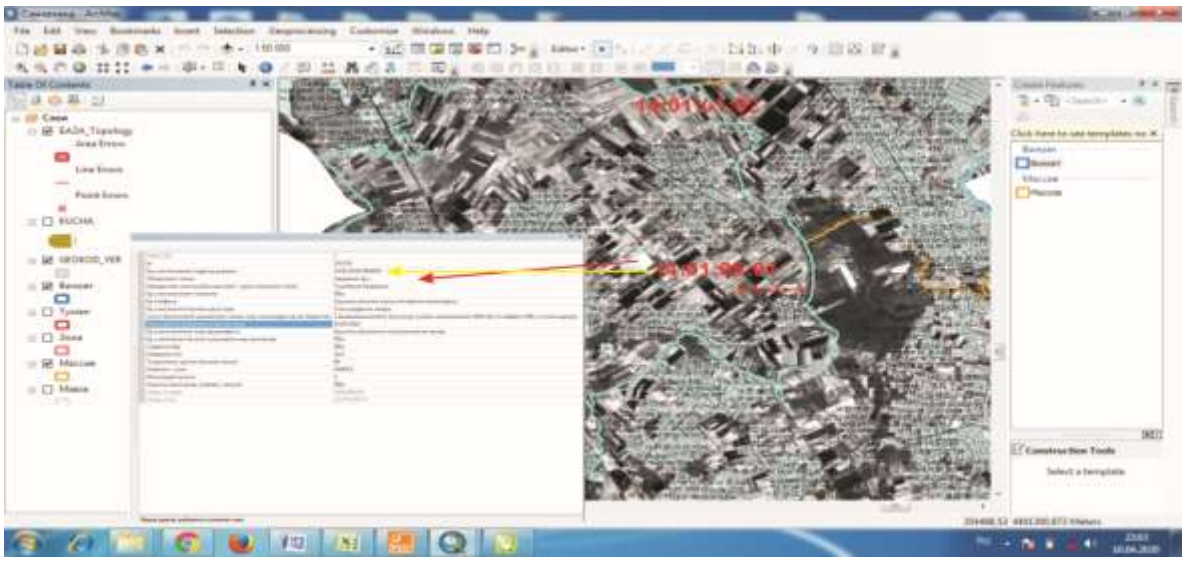

Figure 3. Using the database

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It plays an important role in the rational use of land resources. Another important feature of this created database is its integration into the Google Earth application. To form digital cards and their database, the raster is first downloaded through the SASPlanet program. To upload a raster image of a location, the coordinates of the object are set in the program. Figure 4.

Once the location is determined, the raster is stored in computer memory. After we save it to the computer memory, the raster is downloaded to the ArcMap program. The WGS 1984 coordinate system was used during loading and to merge the data into one system, ArcMap draws the raster in the WGS_1984 coordinate system.

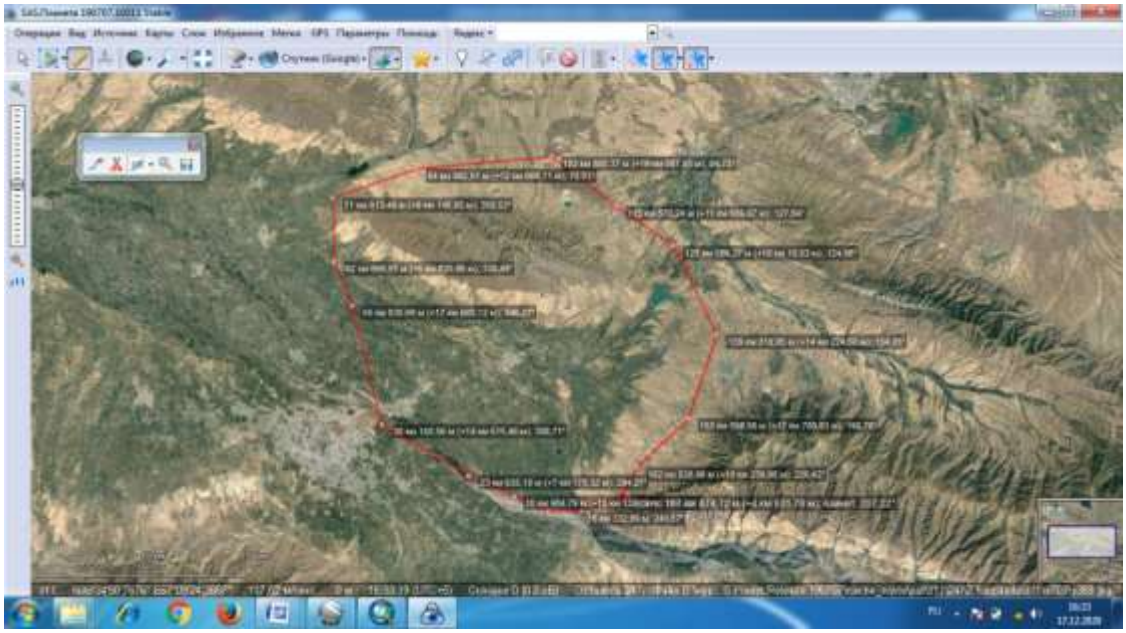

Figure 4. The process of defining an area based on coordinates.

From the Arc Toolbox window, enter Data Management, Projection and Transformation, and after selecting Project, the raster image is automatically linked to the WGS_1984 coordinate system Figure 5. We need to make sure that the raster image is linked to the coordinate system. The results of the field work and the data obtained are downloaded to the ArcMap program and sent directly to the database.

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Figure 5. Linking a true image to a coordinate.

Once all the data has been generated in the GIS programs, it should be exported to the national geographic information system database as needed. This database, created in the GIS software, is not only user-friendly, but also saves time when integrating into Google Earth.

For example, if we look at the “Kayum ota” farm, we can see that illegal houses were built on a total area of 21.66 but 6.20 hectares

6-расм. Фермер хўжаликларида кузатилган ўзгаришлар динамикаси.

Conclusion

A new technology for updating cadastral maps has been developed, with a focus on remote sensing materials being analyzed and evaluated. This method of updating and

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compiling cadastral maps not only speeds up the work process, but also increases the quality and efficiency of work.

3. This database was created in ArcGIS based on statistical, cartographic and up-to-date data. The created database and integration into Google Earth will allow companies, organizations and professionals to use it widely.

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