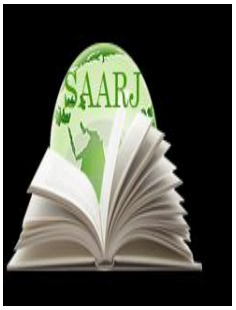

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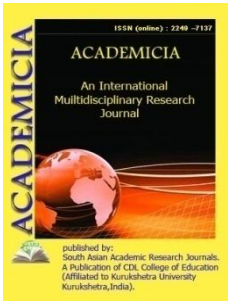

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METHODOLOGY OF MONITORING AGRICULTURAL LAND OF BULUNGUR DISTRICT AND CREATION OF ELECTRONIC DIGITAL CARDS FOR CADASTRE OBJECTIVES

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ABSTRACT

The article addresses the issues of maintaining the landscape and ecological balance of the regions, increasing land productivity, improving land cadastre in accordance with modern technologies and rapid monitoring on the basis of GIS (geographic information systems) technologies. The work also provides information on land cadastre indicators in the new century of technologies, ways of their collection, the role of GIS technologies, principles, methods of cadastral mapping and problems related to their improvement and development. In addition, the article includes an inventory of district land resources and the creation of cadastral maps, as well as a qualitative analysis of existing agricultural land.

KEYWORDS: *Landscape, Relief, Ecological Balance, Monitoring, Cadastre, Land Cadastre, GIS, Scale, Plan, Electronic Map, Digital Map, Map Creation Methodology, 3D Model.*

INTRODUCTION

Of particular importance in the world are targeted research on the activities of the economic movement, maintaining the landscape and ecological balance of regions, increasing land productivity, conducting land cadastre in accordance with modern technologies and operational monitoring. In this regard, one of the important issues in the monitoring of agricultural lands is their qualitative analysis and improvement of land cadastre on the basis of GIS (geographic information systems) technologies.

1: 10000 used in agricultural lands in our country; 1: 25000; one of the important issues is the creation of digital electronic cards instead of paper cards with a scale of 1: 50000 and their

introduction into production. Therefore, one of the most pressing issues today is the correct organization of geodetic and cartographic work and the use of modern geographic information system technologies in its implementation.

Therefore, in the efficient and rational use of agricultural land, it is important to monitor their quantity and quality, and at the same time to develop a methodology for creating electronic agricultural maps using GIS programs.

Primary data and their description

Monitoring of agricultural land in the Republic is carried out on the basis of the "Land Code" of the Republic of Uzbekistan, the Regulation "On Land Monitoring" and a number of other documents [1].

3.3 - Further improvement of the reclamation of irrigated lands in accordance with the Decree of the President of the Republic of Uzbekistan Sh.M.Mirziyoev dated February 7, 2017 No PD 4947 "On the strategy of further development of the Republic of Uzbekistan" 3.3 - Modernization and accelerated development of agriculture; development of a network of land reclamation and irrigation facilities; intensive methods in the field of agricultural production; First of all, the introduction of modern water and resource-saving agro-technologies, the use of high-yield agricultural machinery [1]. One of the important tasks is to implement these tasks, i.e. to further improve the reclamation of irrigated lands, rational and efficient use of agricultural land and on this basis to create a scientific basis for cartographic support of the state land cadastre using GIS technology.

The purpose and objectives of the study

The purpose of the study is to improve the methodology for monitoring and creation of electronic digital maps of agricultural lands of Bulungur district for cadastral purposes. For this purpose, the following tasks were identified: Development of a methodology for maintaining the land cadastre system of Bulungur district of Samarkand region using GIS technologies and the development of a methodology for creating electronic digital maps of agricultural lands of Bulungur district using GIS technologies.

The object of research is agricultural lands of Bulungur district of Samarkand region.

The subject of the study is an electronic map based on GIS technologies in the conduct of state land cadastre in Bulungur district of Samarkand region.

Research methods

The study used geographical comparison, cartographic, zoning, historical, photogrammetric, geoinformation and other methods.

The degree to which the problem has been studied. Issues of rational use of agricultural land in the country and the organization and conduct of state land cadastre and the creation of cadastral maps on the basis of modern methods I.A. Giniyatov, T.P. Magazinshchikov, A.B. Borisov, A.G. Yunusov, A.I .Ivanov, V.P. Mazalov, A.A. Korolev, S.A. Avezboev, E.Yu. Safarov, I. Musaev, S.N. Volkov, A.R. Bobojonov, J.S. Sattarov, L.T. Tursunov, X.A. Abdullaev, M.M. Muhammadjanov, X.T. Risqieva, Q.R. Rakhmonov, A.Sh. Gafurov, G.A. Tolipov, A.J. Gafirov are covered in scientific research. However, in the above-mentioned works of scientists and

researchers, the development and territorial organization of land cadastre, as well as the conduct of land cadastre in accordance with modern technologies and rapid monitoring have been studied in general.

Also, the scientific works of the above-mentioned scientists have not sufficiently studied the issues related to land cadastre indicators, ways of their collection, the role of GIS technologies, principles, and methods of cadastral mapping and their improvement and development in the new century.

THE MAIN FINDINGS AND RESULTS

It is known that land monitoring is a system of analysis of information collected on the basis of timely detection of quantitative and qualitative changes in the land fund of a particular area, assessment of their productivity and observation of the positive and negative consequences.

Based on the above, we set ourselves the goal of qualitative monitoring of agricultural land in Bulungur district of Samarkand region, ie the analysis of the productivity of existing irrigated land in the district. In our study, generally accepted standard methods were used.

Existing plan-map materials, acts of acceptance of completed works and materials of land survey were used in the monitoring of existing irrigated lands in Bulungur district.

In our research, the monitoring of the land fund of Bulungur district was carried out on the basis of specially organized regular observations, ie photography, inspection, direct measurement, comparison with data from previous years. Based on the results of the inspection, the data were evaluated.

Bulungur district is located in the north-eastern part of Samarkand region, bordered on the south by Urgut district, on the south-west by Taylak district, on the west and north-west by Jambay district, on the north and northeast by Jizzakh region.

Bulungur district belongs to the arid subtropical continental climate zone of the Central Asian province according to climatic conditions. Characteristic features of the climate of this zone are continentality, high soil and air temperatures in summer, uneven distribution of atmospheric precipitation. According to the Samarkand meteorological station, the average annual temperature in the district is + 14.1^{o}C. The hottest month is July with an average temperature of + 25.5 ^{o}C, the coldest month is January with an average temperature of -0.3 ^{o}C. The average annual rainfall is 328 mm, and its main amount falls mainly in the autumn-winter-spring months. Typical irrigated typical gray, gray-meadow, meadow-meadow, meadow and swamp-meadow soils are distributed in the district [7].

The total land area of Bulungur district is 75197 hectares, including 53728 hectares of agricultural lands (01.01.2020). The district has opportunities to grow vegetables, horticulture, silk and a number of other agricultural products. The area of arable lands in the district is 28,135 hectares, of which 15,637 hectares are irrigated lands. There are also 8357 hectares of perennial trees in the district. Farms in Bulungur district are currently attached to 17 TFMM (Tractor Fleet of Machine Mechanization) [8].

It is known that the main factor in the formation of a database for land cadastre is the inventory of available land resources and the creation of a cadastral map of the area. These two processes

are inseparable because they use common source materials, field work is performed by a single executor at the same time, and they are performed in a mutually integral state. The results of the inventory are presented in the form of cadastral cards and inventory materials (inventory duty cards) describing the activities carried out and their description.

The connection between the spatial data contained in the cadastral inventory maps is made through the identifiers of the land plots. Inventory work is done through certain identification numbers. When compiling cadastral maps, this index is based on cadastral numbers. Such indicators are performed using special identifiers when entering data in the formation of the state land cadastre database.

Cadastral map is a set of measures for the creation of a cadastral map of a district or massif (farm) [4, 6].

The cadastral map is developed to visually reflect the results of land inventory, to determine the spatial location of land plots and their boundaries, areas [2, 3]. This will pave the way for the creation of cadastral duty cards. It is advisable to make cadastral maps and farm plans on the following district cadastral maps at a scale of 1: 10,000, and farm plans at a scale of 1: 1000 and 1: 2000.

Cadastral maps and plans should be developed using digital technology, as they cover a large area. This requires geodetic measurements and remote sensing. In some cases, for small areas, it is necessary to make plans on a scale of 1: 2000, 1: 1000 and especially 1: 500 using tachometric survey [5].

Targeted research has shown that the creation of cadastral maps and plans shows the need to develop special technology for the creation of land cadastral maps, which is not fundamentally different from the methodology of cadastral digital maps made in previous studies. The development of this technology was mainly based on aerospace methods and geodetic field measurements. However, in addition to aerial photography materials, it is necessary to use the results of field studies in the form of vector models of existing cartographic materials and object contours [9, 10.]. In the methodology of creating these cadastral maps, remote sensing materials are used as the main source. This, of course, is done through geodetic photogrammetric processing in GIS technologies. This technology of advancing the work on the creation of cadastral maps reflects the unity of cadastral map and inventory processes. It was based on the use of modern GIS principles and methods. The technology of creating cadastral maps on the basis of remote sensing materials and geodetic data is shown in Figure 1.

In the formation of cadastral maps, land cadastre maps were developed on the basis of the GIS ArcGIS program.

In addition, the created 3D model based on geodetic data was integrated with the created cadastral maps and showed the need to organize cadastral map plans on the basis of 3D models in areas with difficult terrain.

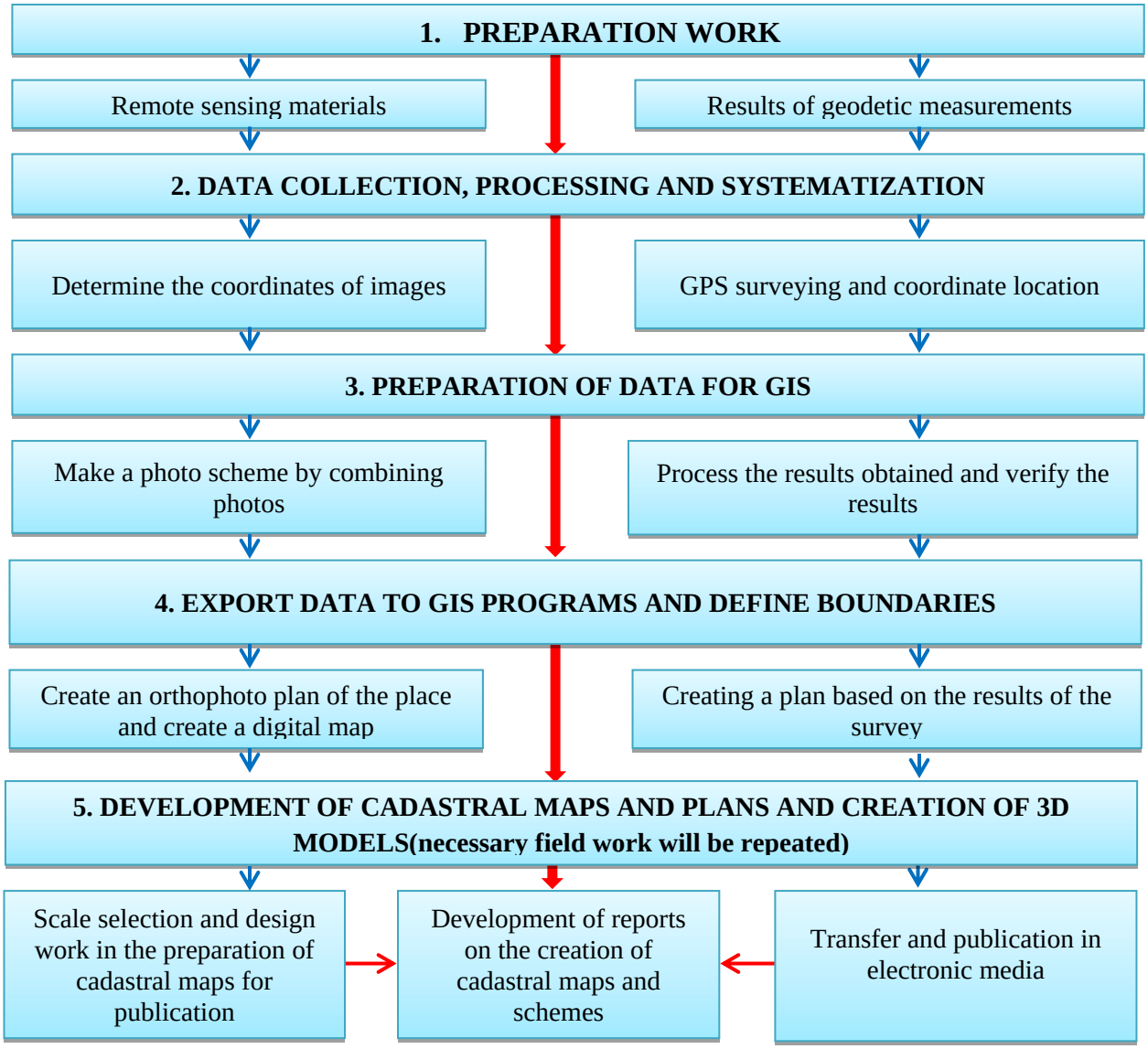

Figure 1. Technology of cadastral mapping on the basis of remote sensing materials and geodetic data.

In our research, along with the inventory of district land resources and the creation of cadastral maps, a qualitative analysis of existing agricultural lands was carried out. At the same time, the quality assessment of 24907.2 hectares of irrigated lands, including existing arable lands, perennial forests, arable lands and irrigated gray lands in the district was analyzed.

Humus plays an important role in the processes, changes and development of soil properties. This is because the organic matter in the soil has the ability to accumulate and retain large amounts of nutrients and moisture due to its ability to absorb a lot of water and its capacity.

The total amount of humus on 8458 hectares of irrigated land in the district is up to 1%, and on 16334 hectares - from 1.1 to 2%. Soils containing more than 2% of humus are 43 hectares in the district, located in the Bulungur massif.

9237 hectares or 37% of irrigated lands in the district are eroded to varying degrees. In particular, 3,810 hectares were weakly eroded, 5,134 hectares were moderately eroded and 293 hectares were severely eroded.

The average score of irrigated agricultural lands in the district is 61.2 points.

It is known that soil evaluation in the country is carried out on the basis of the "Guidelines for the evaluation of irrigated soils of the Republic of Uzbekistan", taking into account the productivity of agricultural crops there.

Taking into account the natural fertility of soils, the productivity of irrigated lands and their potential for agricultural use, irrigated lands in the district were combined into 10 classes on productivity (on points), 5 agricultural cadastral zones (groups) on soil quality.

There are no lands of the first cadastral group in the district, ie lands of I and II classes, which are not suitable for agricultural use.

Lands of poor quality and worse are class III and IV lands and are included in the second cadastral group. The productivity of these lands is much lower. The area of lands belonging to this group in the district is 142.9 hectares, which is 0.57% of irrigated arable land. In terms of quality, these soils have a score of 21-40, and such soils are found only in the H. Olimjon massif. These lands are part of the stage of active development and cultivation in agriculture. These soils are low-yielding soils with one or two different negative character factors. The soils in this cadastral zone are subject to high humidity and irrigation erosion.

The area of lands included in classes V and VI and belonging to the third cadastral zone in terms of productivity in the district is 9927.7 hectares. In relation to the total irrigated agricultural land area of the district, the area of land belonging to this zone is 39.86%.

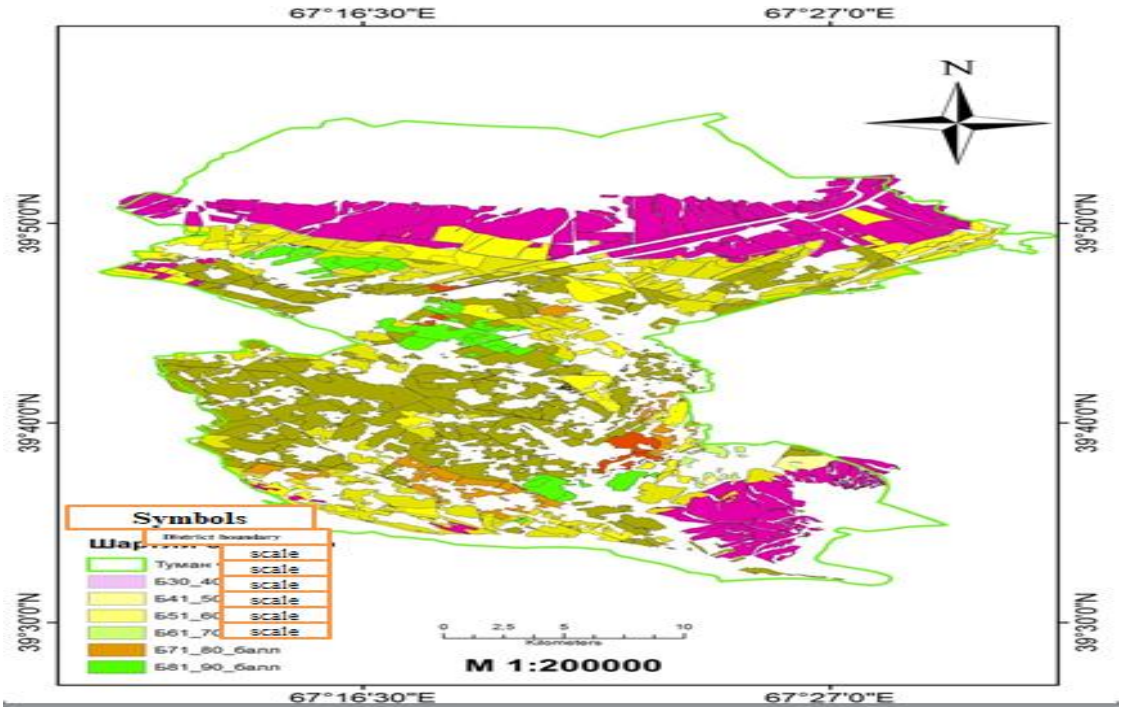

TABLE 1 QUALITY ASSESSMENT OF IRRIGATED AGRICULTURAL LANDS OF BULUNGUR DISTRICT OF SAMARKAND REGION

№	Massifs	Classification of soil by level of fertility										Total	Average score 2018 y
		Bad lands		Low-average soils		Average lands		Яхши ерлар		The best lands			
		Icl ass	IIcl ass	IIIcl ass	IVcl ass	Vcl ass	VIcl ass	VIIcl ass	VIIIc lass	IXcl ass	Xcl ass		
		Bonitet ball											
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100		
1	A.Temur					186,9		153,4				340,3	54,2
2	Uzbekistan						271,0	1215,9				1486,9	62,1
3	A.Maxsumov						280,8	813				1093,8	59,1
4	Ipakyuli							1812,9				1812,9	67,8
5	Kildon							505	250,6			755,6	66,1
6	M.Ulugbek					548,4		1241,9	253,2			2043,5	63,1
7	X.Olimjon				142,9	328,6	727,7	80,3	125,6			1405,1	52,9
8	Mingchinor						369,7	1238,5	41	830,8		2480	69,7
9	Zarbdor					451,2	108,6	885,3	30,9			1476	58,7
10	Zarafshon						235,8	502,2				738	60,2
11	Choyantepa					93,1	204			399,3		696,4	68,5
12	Beshkubi					79,6	107,2	1320				1506,8	60,3
13	Dustlik					619,0	248,6	788,3				1655,9	58,3
14	Bulungur					393,7	978,9	42,1		455,3		1870	62
15	F. Yuldosh						963,9	1034,4	81,1			2079,4	62,8
16	Gubdin					1149,2	982,7					2131,8	48,6
1	A.Navoi					131,	467,	109,	613,1	12,7		1334	63,6

7						3	8	8				,7	
Total					142,9	3981,0	5946,7	11743,0	1395,5	1698,1		24907,2	61,2
By area class				142,9		9927,7		13138,5		1698,1			
Area in%				0,57		39,86		52,75		6,82			

Soils distributed in this zone have a 41-60 quality score and are moderately or less susceptible to irrigation erosion, salinization and other adverse effects. As a result of improper use of these lands, the slopes are washed away. As a result, there is a decrease in humus, which is one of the main elements of soil fertility, and nutrients needed for plants. The soils of this zone are found in Dustlik, Kildon, Choyantepa, A.Temur, Gobdin massifs and a number of other areas of the district.

Classes VII and VIII, which are above average in quality and have good lands, are included in the fourth cadastral zone. The soils of such areas are of good quality and are rated with a 61-80 quality score. The soils of the fourth cadastral zone are 13138.5 hectares, which is 52.75% of the total agricultural area in the district (Table 1). The soils of this region have changed during long-term irrigation and cultivation, and are characterized by their constant yield and positive properties.

The soils of the fourth zone are important for the cultivation of agricultural crops and require proper agro-technical and reclamation measures in these areas. The soils of this zone are distributed in almost all massifs of the district.

The fifth cadastral zone includes soils belonging to classes IX and X, which are very good quality and high lands. The lands included in this zone make up 1698.1 hectares in the district, which is 6.82% of the total irrigated land. On the basis of targeted research and the above data, as well as modern GIS, a 1: 200,000 scale soil map of Bulungur district was created (Figure 1).

CONCLUSION

The development of methods and technological schemes for the creation of large-scale digital maps is important in the formation of land cadastre. Cadastral maps at a scale of 1: 10,000 on the basis of modern GIS programs play an important role in this. Based on the results of monitoring of agricultural lands in the district, it can be concluded that a number of reclamation and agro-technical measures are needed to increase the productivity of existing lands.

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