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IMPORTANCE OF MODERN GIS TECHNOLOGIES IN SOIL SALINITY MAPPING

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Abstract. *Nowadays, the technology of creating high-precision electronic digital maps has been developed in various areas of the national economy, especially in the field of using agricultural maps, with wide application of modern GIS programs. At the same time, digital maps of soil salinity are also created in computer programs such as ArcGIS.*
Keywords: *GIS, electronic maps, ArcGIS, bal-banitet, geoinformation, soil classification.*

The negative economic difficulties that have arisen in recent years in the agriculture of our republic have led to the development of soil salinization processes. In connection with such a significant level of degradation, the use of geoinformation technologies is of crucial importance for optimizing land use and restoring territories affected by the environmental crisis and salinization.

In solving the problems of rational use of land resources in our region, the creation of high-quality soil salinization maps is of great importance, the process of creating which requires large time and financial costs. These works can be accelerated and made more efficient by using modern geographic information systems. Traditional methods and approaches to creating such maps are no longer in demand. Naturally, there is a need to create a single methodological base that would allow combining various scientific approaches into a single understanding. The importance of geoinformation technologies in this regard is that they present data in text, tabular and graphical form.

Research object and classification. When developing any territory, the land use system must correspond to the resource potential of the land, which means that landscape sustainability is understood without additional investments, and the probability of undesirable environmental consequences tends to zero. If we consider saline soils as an object of research, then saline soils are understood as soils containing more than 0.3% salts that are easily dissolved in water and have a negative impact on agricultural crops.

Determination of the pace and timing of implementation of measures to reduce the salt content in soils is carried out taking into account the degree of soil salinization. The division of soils into groups depending on the degree of their salinization is called salinization classification. Soils common in Uzbekistan are divided into the following types depending on the degree of salinity.

Table 1

Salinity level	Sulfate-chlorinated saline soil		Chlorinated-sulphate saline soil	
	Chlorine – ion	Total salts	Chlorine – ion	Total salts
Unsalted	Less than 0.01	Less than 0.25	Less than 0.01	Less than 0.3
Low salinity	0.01 - 0.04	0.25 - 0.50	0.01 - 0.04	0.3 - 1.0
Moderate salinity	0.04 - 0.20	0.50 - 1.0	0.04 - 0.20	1.0 - 2.0
Strong salinity and brackish	0.20	1.0	0.20	2.0

Research results. The accuracy level of soil mapping depends on the scale of the research and is determined by its size, goals and objectives, farm specialization, and natural conditions. The more diverse the terrain and vegetation of the area, the more diverse its soils will be. They are checked at such scales. Soil maps are divided into the following types:

1. Detailed maps with a scale from 1:200 to 1:5000.
2. Large-scale maps, with a scale from 1:10,000 to 1:50,000.
3. Medium-scale maps, from -1:100,000 to 1:300,000.
4. Small-scale maps, with a scale exceeding 1:300,000.

In some cases, when analyzing land resources of individual plots, information on soil properties is not linked to soil map files, but is extrapolated using field soil survey data. In addition, the statistical indicators of soil condition compiled at the end of the year are directly integrated into the computer program. (Table 2)

№	Viloyatlar	Jami sho'rlangan maydon	Kam sho'rlangan	O'rta sho'rlangan	Kuchli sho'rlangan	Sho'rlanmagan maydon
1	Andijon viloyati	7,6	3,2	4,4	0	258,3
2	Buxoro viloyati	236,3	170,7	59,1	6,5	38,6
3	Farg'ona viloyati	125,2	102,5	20,8	1,9	237,5
4	Jizzax viloyati	233,2	150,9	76,9	5,4	67,2
5	Qoraqalpog'iston Respublikasi	383,1	152,2	189,6	41,3	125,5
6	Qashqadaryo viloyati	230,5	175,6	43,6	11,4	284,4
7	Xorazm viloyati	265,4	152,2	81,3	31,9	0
8	Namangan viloyati	23,4	16,5	6,2	0,7	258,9
9	Navoiy viloyati	100,5	87,8	11,9	0,8	22,5
10	Samarqand viloyati	4,6	4,3	0,3	0	374,9
11	Sirdaryo viloyati	280,7	230,2	45,9	4,6	7,1
12	Surxondaryo viloyati	98,7	69,6	28,1	1	227
13	Toshkent viloyati	10,7	8,9	1,7	0	387,7

The summarized statistics as shown above are included in the attribute data of the soil salinity map created in ArcGIS and are plotted on the map using mapping techniques such as color imagery and color-quantity mapping.

Such an electronic map will be created for each array, for each farm and for each agricultural plot. In this case, land surveyors of each array collect information about the territory assigned to them and submit it to the district. One or two specialists from the district land resources department and the state cadaster enter the data into the computer and ensure the implementation of the full cycle of information processing.

It has been determined that the organization of such work is of great importance in the field of agriculture, especially in the use of land resources and the implementation of socio-economic reforms. The use of GIS programs to create soil quality maps allows us to improve the natural and socio-economic conditions of regions, increase land productivity, and predict the state of the land

for the coming years based on the use of advanced scientific achievements. The task of classifying these settlements will allow us to conduct a scientific analysis. The results of the analysis help us understand the future.

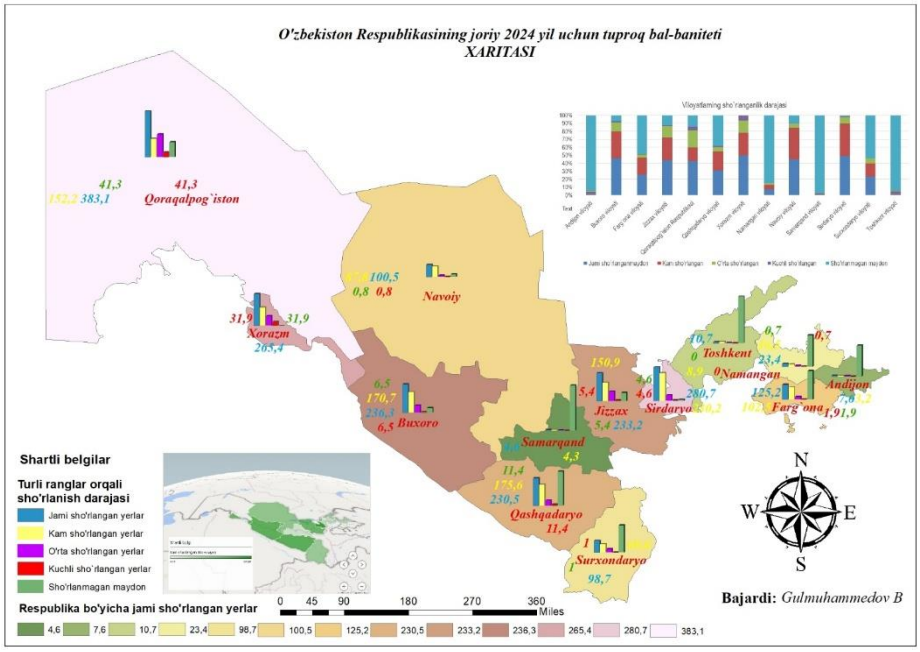

Figure 1. Sample soil salinity map created in ArcGIS.

Computer modeling of soil maps based on GIS technologies is the main method of rational soil management. The object of cartographic modeling will be a map of the potential yield assessment based on soil, agro-landscape and topographic maps. This map shows soils divided into regions according to the classification. The modeling results will be considered as a basis for further economic modeling of the agricultural land use system as a result of the research, which will provide a complete picture of the state of agricultural land and its efficient use in the coming years.

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