CREATING AGRICULTURAL MAPS USING GEO-INFORMATION SYSTEMS AS AN EXAMPLE OF BANDIKHAN DISTRICT

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Abstract: By improving the methods of providing geo-information for the monitoring of areas engaged in cluster activities, we can cover the processes of application of geo-information programs, population analysis, population visualization, population exchange, control and monitoring processes, and - we will achieve a general representation on the cards.

Keywords: . GIS, clustering Mapping, Digitization, Vectorization, Layers, Themes, Synthetic, Electronic Maps, Modelling.

Introduction.

Bandikhon district is a district in Surkhandarya region. Bandikhon district borders Kumkurgan, Kyzyriq, Zharkurgan, Sherabad, Boysun districts of the region. The area is 0.20 thousand km². The population is more than 75,000 people (2019). The economy is mainly agrarian. Irrigated cropland makes up 70% of the district's land fund. Pastures make up 27.5%, and arable land makes up 2.5%. There are 6 collective farms in Bandikhon District [1-4]. Cotton cultivation occupies the main place in agriculture. Cereal crops are grown, viticulture and horticulture are developed. There are 4 small enterprises, 46 farmers and farms, and 5 joint-stock companies specializing in animal husbandry. There are 22 private small enterprises, 11 mills, 40 private shops and kitchens, 6 objuvoz. Sherabad-Denov highway crosses Bandikhon district. There is a branch of the Republican Horticulture, Vineyard and Winery Corporation named after Schroeder in Bandikhon district. There are 6 collective farms in Bandikhon district. In agriculture, cotton growing occupies the main place. Cereal crops are grown, viticulture and horticulture are developed. Bandikhon wheat has recently been priced 1.5-2 times higher in the markets. Hisori sheep weigh 180-200 kg in Bandikhon [5-10].

Bandikhon district is an area engaged in agriculture and cluster activities. Therefore, the main goal of creating maps of these areas is to provide a rich and comprehensive source of information and databases, to develop the economic situation in the region, as well as the export-import policy; optimization and

practical application are very relevant. The economic situation is unstable and there are changes under the influence of the human factor. Therefore, it is used as a basis for the implementation of the project and strategy for the creation of a map of the regions and the volume of goods and products produced by agricultural farms and clusters.

Maps of the areas of agriculture and clustering activities allow to visually determine the place and time of the ecological situation that happened in the past, at the present time and may happen in the future, to describe it in color, and to describe its probability.

With the help of such maps, great opportunities have arisen to show all the economic and agricultural aspects of the region. Therefore, the development of maps of this area is an urgent topic [11-14].

Study area.

Bandikhon district is a district located in the center of Surkhandarya region, the main sector of which is agriculture. It mainly grows cotton and grain products. The area is located at 37.880548 latitude and 67.4416425 longitude. The territory of Bandikhon district is mainly located in the northern part of the Surkhan-Sherabad steppes, which decrease from north to east and south in the west. In the territory of the district there are Sherabad-Sariqamish mountains and Bandikhon-Kiziriq hills, which are mainly from the south-west to the north-east. The climate is a dry subtropical climate. The average temperature in January is 2.5 °C — 3 °C, July is 30 °C — 31 °C. Annual rainfall is 160-200 mm. Bandikhon stream flows from the north of the district. District farms are irrigated from the Aqqopchigay and Sherabad streams. The soil is typical gray, sandy and partially barren soils. Plants consist of ephemerals and ephemeroids. Wolf, fox, reptiles, birds and insects (scorpions, blackworms) live in mountain parts and ravines [4].
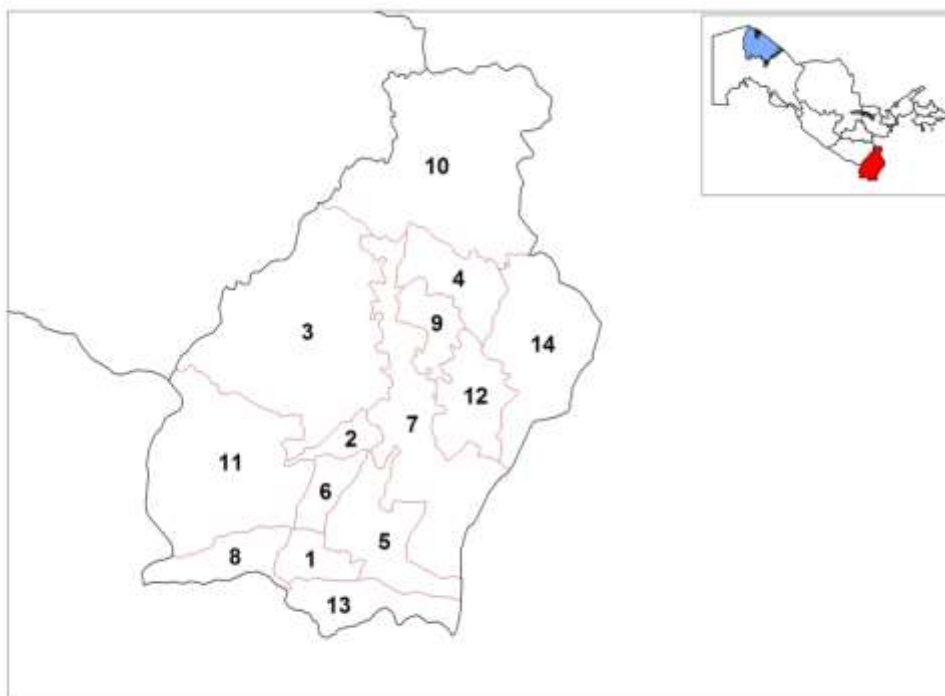
Fig 1. *Map of the study area, Bandikhon district.*

Methods.

The methods of creating and analyzing electronic maps with the help of modern GIS, software and data storage are the highest possibilities today. Agricultural maps allow to show the past, present and future, as well as to determine the place and time of the situation in agriculture by depicting it with color; allows to develop measures for the protection of natural components [15-18].

Figure 2. GIS subsystem
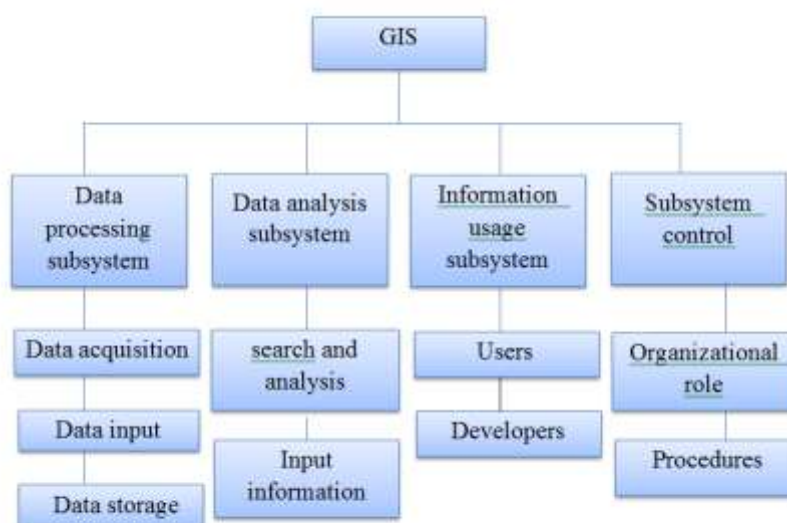
ArcGIS: [software] ArcGIS is a GIS software developed by the Environmental Systems Research Institute (Esri) that enables the collection, storage, management, visualization, export, analysis, and mapping of geographic data. is a set of supplies [19-22] (Fig. 3).
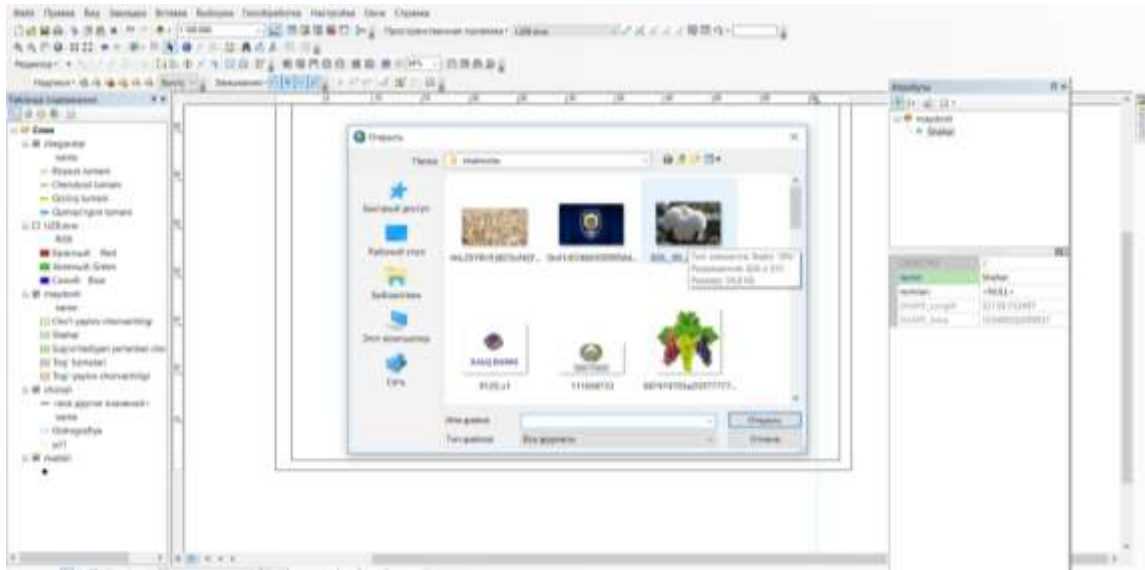

Figure 3. ArcGIS software image.

Below, we will consider the process of creating an agricultural map of Bandikhon district using the ArcGIS program one by one. After making the ArcGIS program ready for working, we create a base and name it with a special name. In the Sloy section, we separate the area of the studied area and define its boundaries. Conventional symbols, considered the language of cartography, increase the readability of the map, and strict adherence to and correct use of symbols is an important aspect. The boundaries of the territory are divided into types as shown in the figure below (Figure 4).
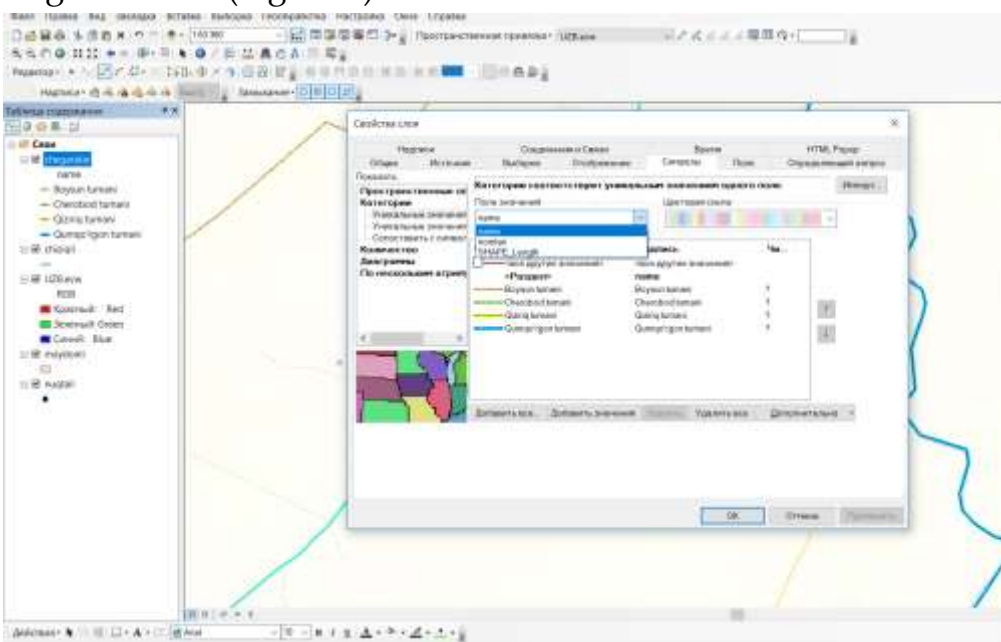

Figure 4. *Separation of the territory of Bandikhon district by borders.*

Covering more types of cartographic methods when making maps enriches the map and becomes a useful resource when applied to areas. We used cartographic methods to create a good map: quality color method, visual methods, line method, diagram method and other methods [23-26]. For example, we distinguished the agricultural sectors of the region using the qualitative color image method. Among them are the areas of cattle breeding, cotton cultivation and polys crops. The types of products in this area were described using the visual method (Fig. 5).

Figure 5. Separation of the region by agricultural sectors.
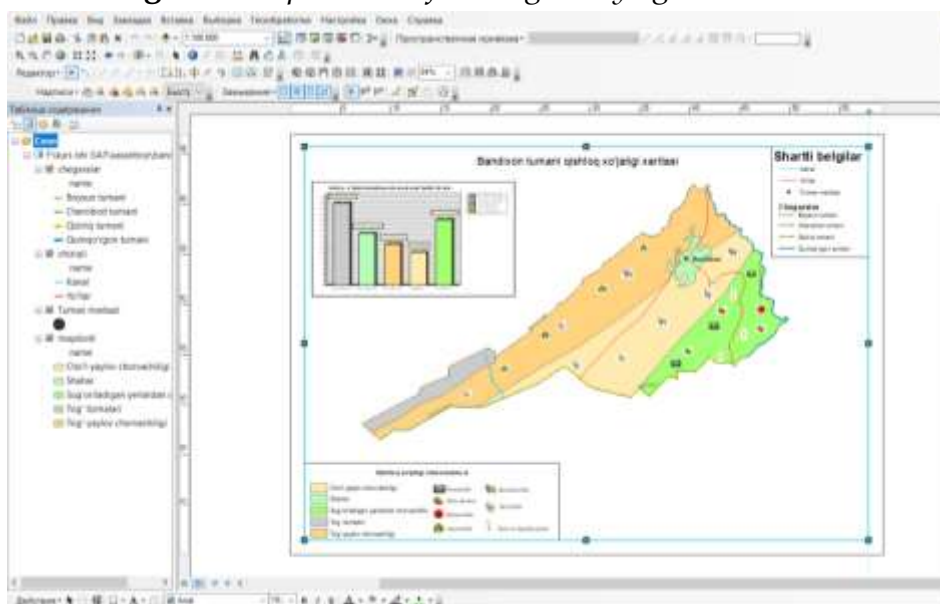
Topographic conventional signs - a system of graphic representation of a location object and details about them on plans and maps; with their help, the location, quality and numerical descriptions of objects and details are shown. Topographic conditional signs are divided into several main types. Objects that can be depicted in the scale of the plan according to their dimensions while preserving the true proportions are given with conditional symbols of scale; Objects whose appearance (outline) cannot be depicted on the scale of the plan, or which, even when depicted, turn into points due to their small size, are given with conventional symbols without scale. On small-scale maps, they are usually indicated by a non-scale symbol - a punch. Topographic conditional signs are developed depending on the purpose of the map to be created [27-30].

For the card we created, the following visual conditional symbols were used (fig. 6).

Figure 6. Use of visual symbols on maps.

The scientific significance of the research results is that for the first time the GIS-technologies ArcGIS program was used to map the state of Bandikhon district, we developed the structure and content of the agricultural map, as well as improved methodological approaches to their creation [4-10].

The map structure of Bandikhon district is a geographic information system, in addition, this map and its thematic layers, developed on the basis of the database, were also developed. According to the content of the map, we combined the existing information in the field of agriculture and managed to optimize it and turn it into a useful resource that can be used in all areas, and we presented the finished map below.

Discussion and conclusion.
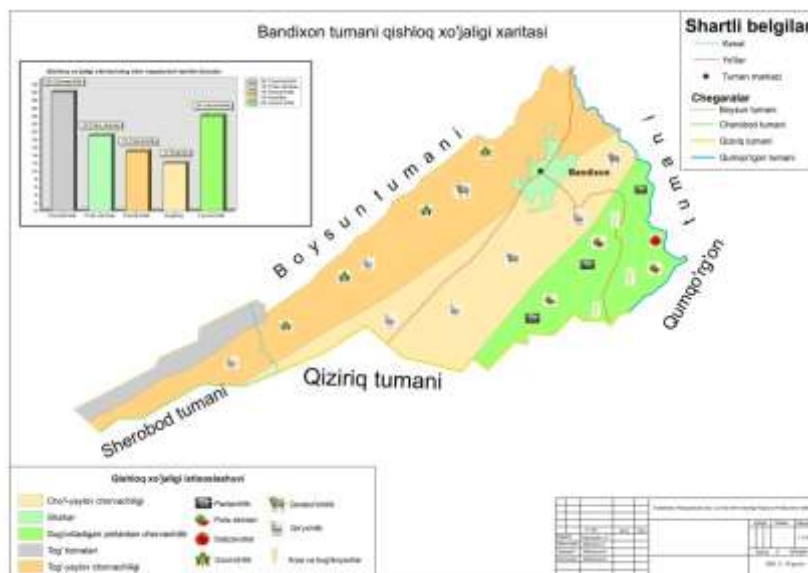
Cards are one of the types of payments that are used in several fields today. These maps allow you to display, analyze, and detail communities using geographic observations.

Agricultural cards are used in tourism, transport, educational institutions, politics, ecology and many other fields. The controls they provide are used in several different platforms and applications. Such platforms are Google Maps, Bing Maps, OpenStreetMap, etc.

The use of these cards will record many achievements. They have advantages and steps compared to other authorities. The level of importance is increased by depicting the information of organizations engaged in cluster activities on cards. Clustering is an ideal tool for displaying the data of organizations engaged in clustering activities through cards. Showing their governments on the map gives an opportunity to explain more about their activities and the areas where they are located.

By displaying their authorities on a map, it becomes easier to get information about their regions and activities. Analyzing their activities will save you time and increase your customer base. Also, depicting the authorities of organizations engaged in cluster activities on the card makes it easier for them to communicate with other organizations in their specified areas of activity. This helps to develop cooperation and business with other organizations.

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