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PROCEDURE OF TENDENCY MAP ON THE BASIS OF GEOGRAPHICAL INFORMATION SYSTEM OF JALILABAD CADASTRY DISTRICT

Summary

As the inclination increases, soil erosion and, in general, the process of erosion on the slopes intensifies, the moisture content of the soil and soil-forming rocks decreases, the growth of agricultural crops and pastures weakens, and productivity decreases. Taking all this into account, we have developed a slope map with degrees based on the digital elevation model of the Jalilabad cadastral region (DEM file). Slope study and mapping is one of the key measures to protect soils from erosion as well as to combat erosion.

When the slope reaches 3-4°, the washing of the soil is even faster. It is not recommended to plow the fields when the slope is 8-10° and more. From this point of view, as a result of our research, the inclination of the Jalilabad cadastral region has been studied. The lowest inclination range in the study area is 0-2°. Low inclination is observed mainly in the plains of Jalilabad cadastral region. As you ascend to the heights, there is an increase in inclination. Taking into account the propensity in agriculture can lead to high yields.

Key words: *Inclination, Slope, Erosion, Geographic Information System (GIS), ESRI, ArcGis*

Introduction

Geographic Information Systems (GIS) is an information system that collects, processes, stores, prepares, maps, and disseminates information about any location. The application of geographic information systems in the modern information society as the most convenient tool for solving scientific, educational and practical problems related to the use of geographical information is growing rapidly. The emergence of geographic information systems (GIS) marked the beginning of a new phase in the collection, systematization, analysis and mapping of spatial data (G.Sh.Mammadov, R.M.Heydarova, 2016; p 12).

There is a rich set of tools for managing information layers in GIS. The set of tools gives change to put into practice the analysis of connection between which has given.

Maps serve the use of geographic information, playing the role of a very convenient model image. For most GIS applications, interactive maps are the main user interface. Although maps created in a GIS environment are very similar to static paper maps, they are interactive. This means that the user interacts with the map. In other words, each user can zoom in and out on an interactive map. At certain scales, some layers of information may be invisible on the map, and vice versa, some additional layers may appear (G.Sh.Mammadov, 2015;112 p 112).

When plotting geographically on an interactive map, it is possible to obtain additional information about the object, as well as to conduct surveys and analyzes (G.Sh.Mammadov, A.T.Aliyev, L.C.Qasimov, N.S. Ismayilov, C.S.Abdullayev, V.A.Babayev, S.Z.Mammadova, A.C.Hashimov, Z.R.Mammadov, A.B.Jafarov, A.S.Agbabali, J.A.Shabanov, M.G.Mustafayev, G.Sh.Yagubov, S.X.Shukurov. 2018, p 79).

Object and methodology of research

At this stage of our research, Jalilabad cadastral region was selected as the main object of the Geographic Information System (GIS).

The plains and partially the foothills of the Jalilabad administrative district have been included in the Jalilabad cadastral district, which is the study area. The total area is 102.3 thousand hectares (1.2% of the territory of Azerbaijan). The study of soil and climatic features of the Jalilabad cadastral region allowed to reveal the Tazakend - Uchtapa semi-district region (G.Sh.Mammadov, 2003;445 p).

Having studied the inclination indicators in the territory of Jalilabad cadastral region, we have developed an inclination map in the ArcGis program, which is a product of ESRI company of the region (Figure 2). Digital elevation model (DEM) was used to determine the inclination and height of the study area. The most widely used source for scientific research is the ASTER GDEM (Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Global Digital Elevation Model (ASTER), a product of the US National Aeronautics and Space Administration (NASA) and the Japanese Ministry of Economy, Trade and Industry (METI). GDEM)) is considered. The height and slope of the cadastral region were studied on the

basis of Aster GDEM. The following steps were initially carried out to compile the inclination map of Jalilabad cadastral region on the basis of GIS:

1. The exact boundary of Jalilabad cadastral district is developed at a scale of 1:10 000;
2. Digital elevation model (DEM file) has cut according to the boundary of the research area (Figure 1);
3. The inclination map of Jalilabad cadastral region was developed by degrees using the Arctoolbox command;
4. After compiling the map it was printed, on a scale of 1: 100,000.

In addition to the above-mentioned layers, rivers, lakes, the territory of other cadastral districts, etc. located in the territory of Jalilabad cadastral district were created. Developed online. Note that a layer is a collection of objects of the same type belonging to the same subject in a certain area. It is important to prepare the necessary layers before designing the map. To do this, use the ArcCatalog section of the ArcGIS program.

Analysis and discussion

Sloping surface or slope divides the sloping part of the earth's surface into positive and negative relief forms. Depending on its origin, the sloping surface can be an initial (subsea) tectonic structure, denudation, accumulation or erosion. Most of the sloping surface is of complex origin, is formed as a result of slope processes and undergoes certain changes.

The slope is steep, sloping, convex, sunken and stepped, depending on the geological structure, rock composition and denudation processes. Slope, as the name implies, refers to areas with a sloping surface. In contrast to the slope, the areas with a horizontal surface are divided into smooth plains. According to S.S. Voskresensky, slope means areas with a surface slope of more than 1-20 degrees. The slope of the slopes is very different, ranging from 1-2 degrees to 90 degrees. The slope of the slope is one of the main factors influencing the development of slope processes.

Everywhere on the earth's surface, rock particles are affected by another force, gravity. This force tries to move any rock particle in the direction of the slope. As the slope increases, this effect intensifies, and as the rocks exceed the adhesion force, the velocity of the particles increases along the slope. In addition, soil erosion and the erosion process in general are highly dependent on the slope and length of the slopes.

According to the slope of the slopes (S.S. Voskresensky) are divided into the following groups:

- Steep slopes ($a > 35^\circ$ and more)
- Slopes of medium slope ($a = 35^\circ - 15^\circ$)
- Sloping slopes ($a = 15^\circ - 5^\circ$)
- Slopes with low slopes ($5^\circ - 1^\circ$)

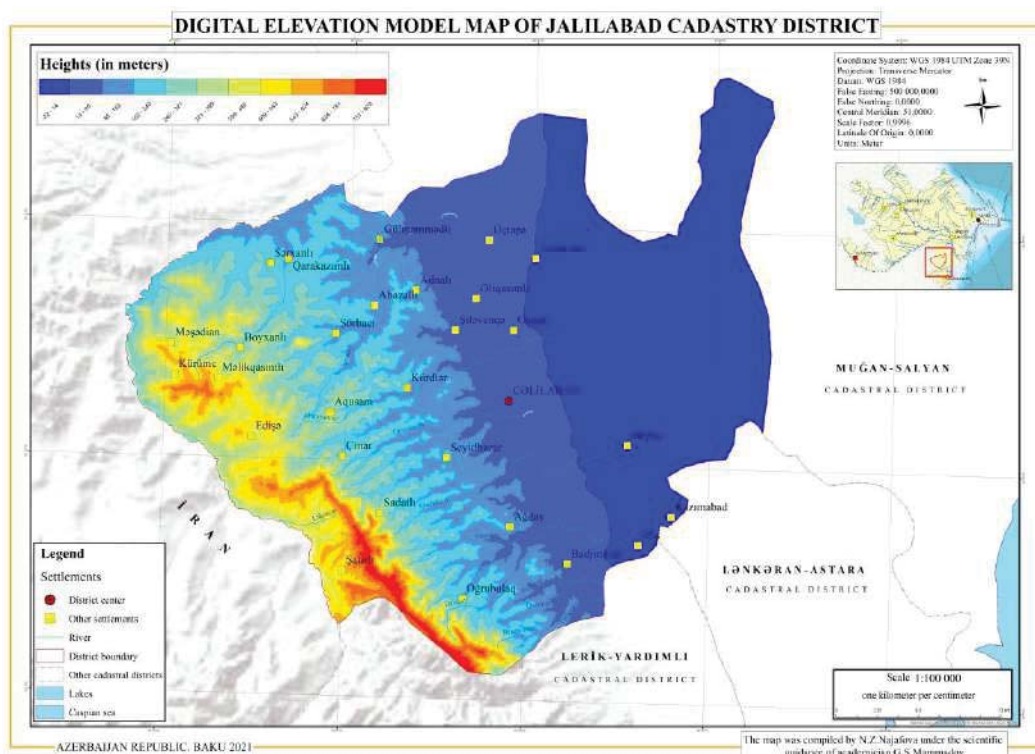
According to their length, the slopes are divided into the following three types:

- Long slopes (more than 500 m)
- Slopes of medium length (500 m-50 m)
- Short slopes (less than 50 m)

Slopes are divided into several types according to their shape: 1. Straight slopes. 2. Convex slopes. 3. Submerged slopes. 4. Stepped or convex slopes.

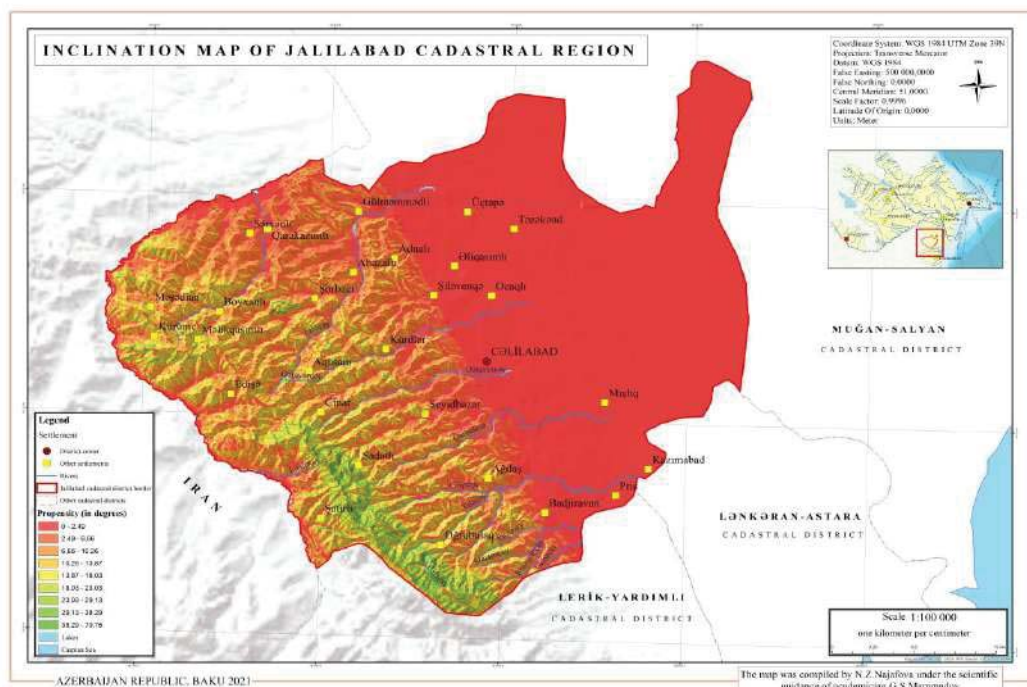
Flat slopes are formed as a result of tectonic uplift and denudation processes of the same intensity (speed). Convex slopes are formed when the rate of tectonic rise exceeds the rate of denudation, while sunken slopes, on the contrary, are formed when the rate of denudation exceeds the rate of tectonic rise. Stepped slopes are formed by the alternation of the last two conditions.

According to their origin, slopes are divided into the following types: 1. Tectonic slopes - they are formed as a result of deformation of horizontal layers by tectonic movements and fractures. In nature, slopes that are not affected by exogenous processes and do not change under the influence of these processes are rare. 2. Volcanic slopes - spread mainly in the area of young erupting volcanoes. The slopes of ancient volcanoes have changed a lot with the process of erosion-denudation. 3. Exogenous slopes are the most widespread on the earth's surface. Because exogenous geomorphological processes are so diverse, the slopes they create are also very diverse in terms of habitat and morphology.



Picture 1. Digital elevation model (DEM) map of Jalilabad cadastral region

It should be noted that as the inclination increases, soil erosion and, in general, the process of erosion on the slopes intensifies, soil and soil-forming rocks decrease, the growth of agricultural crops and pastures weakens, and productivity decreases. When the slope reaches 3-4 °, the washing of the soil is even faster. It is not recommended to plow the fields when the slope is 8-10 ° and more (Alishanov V.A ,1975-140 p, Dis.). From this point of view, as a result of our research, the inclination of the Jalilabad cadastral region has been studied. This includes the development of agricultural crops, pastures, etc. is one of the key issues that is important for.



Picture 2. Inclination map of Jalilabad cadastral region

The result

We have developed a slope map with degrees based on the digital elevation model of Jalilabad cadastral region (Figure 2). GIS is created on the basis of ESRI-ArcGIS technologies. ArcGIS is a software platform. ArcGIS is the most advanced tool for easy creation and publication of maps, software models, web browsers, integration into other systems, geographic data management, analysis, planning and decision making. Slope study and mapping are also needed to protect soils from leaching and to combat erosion. The results of the study allow us to use the ArcGIS software to determine the height and slope of the area and the impact of these factors on soil fertility in the ecological assessment of soils. Knowing that the propensity from the literature has a direct impact on the process of soil erosion, the use of research results to assess future erosion risks and to develop an action plan against erosion is of scientific and practical importance. Soil washing begins where the slope is 2-3 °. The lowest inclination range in the study area is 0-2°. Low inclination is observed mainly in the plains of Jalilabad cadastral region. As you ascend to the heights, there is an increase in inclination. Taking into account the propensity in agriculture can lead to high yields.

References

1. Academician G.Sh.Mammadov, PhD in Biology R.M.Heydarova Soil Mapping of the Mil Plain of Azerbaijan Based on the Aerospace Materials, European-American journal, "Global journal of agricultural research" Vol. 4., №6, December 2016, pp.7-12
2. G.Sh.Mammadov. Azerbaijan Cartography on the Way to Development. Baku: "Science", 2015, 112 p.
3. G.Sh.Mammadov, A.TAliyev, L.C.Qasimov, N.S.Ismayilov, C.S.Abdullayev, V.A.Babayev, S.Z. Mammadova, A.C.Hashimov, Z.R.Mammadov, A.B.Jafarov, A.S.Agbabali, J.A.Shabanov, M.G.Mustafayev, G.Sh.Yagubov, S.X.Shukurov. Methodical instructions on compiling interactive electronic land and ecological price maps of lands on the basis of geographic information systems. Baku: "Science", 2018, -79 p.
4. G.Sh.Mammadov. State Land Cadastre of the Republic of Azerbaijan: legal, scientific and practical issues, Baku: "Science", 2003, 445 p.
5. Alishanov V.A "Spread of erosion in the mountainous part of Jalilabad region and measures to combat it." Baku, 1975-140 p, Dis.
6. <http://www.esri.com>
7. <https://earthexplorer.usgs.gov/> Aspect (geography). Wikipedia

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