

# Evaluative Mapping and Geospatial Analysis of Georgian Viticulture

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## Abstract:

One of the important areas of modern thematic cartography is agricultural mapping. The demands of practice have further increased the need to create maps and atlases for evaluative and prognostic purposes, which are the basis of the management of each agricultural branch.

The scientific novelty of the presented topic lies in the study of viticulture in one of the regions of Georgia - Kakheti, identifying priority territories for its development, assessment and medium-scale mapping.

During the research, categories were divided according to the favorability of viticulture development and distribution. These gradations are:

1. an indicator of the minimum positive characteristic for the favorable development of viticulture;
2. an indicator of the average positive characteristic for the favorable development of viticulture;
3. an indicator of the maximum positive characteristic for the favorableness of viticulture.

The municipalities of Telavi, Gurjaani and Kvarli (17-18 points) are distinguished by favorable natural conditions for the development of viticulture in the Kakheti region. The hypsometric range for the mentioned municipalities is 500 meters, which is the most representative in the conditions of Kakheti for such grape varieties as are: Rkatsiteli, Kakhuri Green, Saferavi, and hybrids. According to the exposition, the slopes here are dominated by south-eastern and eastern expositions. Depending on the soil conditions, the viticulture zones of these municipalities differ from each other. Meadow brown soils and typical brown soils, as well as alluvial soils, which hypsometrically can be located below the 500-meter mark, are considered classic for viticulture in Kakheti conditions, although this type of soil is characterized by a high silt content in floodplains and terrace areas of the territory of the rivers of Kakheti, which determines the high-yielding grape varieties that is common here.

The amount of precipitation in these municipalities corresponds to a gradation of 600-800 mm, which is considered typical for this region. Temperature parameters (maximum and minimum) are taken for the vegetation period (March-October) because exactly during this period the vine is phenologically active. The average positive temperatures recorded in these municipalities are 16.80-18°C. Average negative temperatures are 70-8°C, which is quite acceptable for viticulture in these geographical conditions.

The absolute maximum temperature is 380, and the absolute minimum is 230, it is considered the most representative of grape culture.

The municipalities of Sagarejo, Sighnaghi, Lagodekhi and Akhmeta stand out for their favorable natural conditions for the development of viticulture in the Kakheti region (13-16 points). In these municipalities, the areas of vineyards (real) and potential areas are located at a hypsometric level of 600-800 m. In these municipalities, eastern and southeast expositions predominate.

The function of the auxiliary factor is the surface slope. This parameter is presented on the territory of these municipalities in the form of 50-100 gradations.

In terms of favorable natural conditions for the development of viticulture in the Kakheti region, the municipality of Dedoplistskaro stands out with a low index (11-13 points). In this municipality, the area of vineyards (actual) and

potential areas spread over an 800-meter hypsometric step. Southwestern expositions predominate here. Brown carbonate and black soil types are widespread on the territory of the municipality, which, due to their agricultural production and agroclimatic properties, provide medium and low opportunities for the spread of grape culture. The precipitation amount is 500 mm, which creates less favorable conditions for the spread of grape crops. Average positive temperatures for the vegetation period (March - October) are 15.0, which is relatively low for grapes and far from perfection in combination with other factors. The same can be said about average negative temperatures ( $-5^{\circ}\text{C}$ ) during the vegetation period. Absolute positive and negative temperatures on the territory of the specified municipality are close to ideal indicators - respectively: 39.0 and  $-23.0$ . Analysis of these parameters allows us to conclude that on the territory of the Dedoplistskaro municipality, the decisive factors for determining the distribution area of the grape crop (actually existing and potential territories) are: a) exposition; b) hypsometric step; c) soil type; d) amount of precipitation. Parameters such as: a) average positive and average negative temperatures of the vegetation period (March-October); b) absolute positive and absolute negative temperatures; c) the slope of the surface acts as an additional (helping) factor.

Thus, to assess the actual viticulture areas in Kakheti and identify potential areas for planting vineyards in all municipalities, the following factors are decisive: a) soil type; b) exposition of slopes; c) amount of precipitation; d) temperatures (average positive and average negative) of the vegetation period (March-October).

The supporting role is given to such factors as a) hypsometric stage and b) absolute indicators of positive and negative temperatures.

The methodology of the evaluation cartography of viticulture developed by the author can be used for any other region, for the purpose of viticulture development, in the direction of planning new territories. In the work, the cartographic form of modeling is used for this purpose.