

Geographical Information System of Landscapes of Georgia

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Abstract:

Landscape research and landscape mapping in Georgia emerged in the 1950s. Initially, these studies were purely descriptive fieldwork. Fundamental scientific landscape surveys began in the 1960s.

In 1965, a physical-geographical station was established in the village of Martkopi, near Tbilisi, on the premises of Tbilisi State University. Stationary landscape studies began here, focusing on the structure and functioning of landscapes. Simultaneously, semi-stationary landscape-geophysical and landscape-ethological studies were conducted throughout Georgia, as well as aerial photography of natural-territorial complexes. Spatial expeditionary landscape studies were also conducted. These studies resulted in the publication of landscape bulletins in Georgian, Russian, and French. Landscape maps were compiled based on the analysis of accumulated empirical data (1979, 1985, 2011). Landscape surveys and landscape mapping were conducted under the direction of Professor Niko Beruchashvili.

Since 2000, under the leadership of N. Beruchashvili, work on mapping the landscape-ecological structure has begun in Georgia. A number of works were published (2002, 2003, 2009). In this area, an international conference was held in Tbilisi (2005), the proceedings of which were published in the international peer-reviewed periodical "Geographical Journal of the Caucasus." Based on landscape research and landscape mapping conducted and currently ongoing in Georgia, a Geographic Information System (GIS) of Georgian landscapes has been created, which includes the following elements:

- 1) The cartographic element – includes landscape maps of Georgia and large-scale landscape maps of different regions of Georgia, compiled on the basis of the developed methodology (Beruchashvili, 1983, 1989, 1995, 1995; Gordetsiani, 2014). Landscape maps of Georgia are compiled at the level of landscape genus (scale 1:500 000, 1:200 000), and maps of different regions of Georgia - at the level of landscape types (scale 1:50 000, 1:100 000). Landscape-ecological framework maps are component maps of the landscape (geological, geomorphological, dynamic processes, soils, climate, vegetation, human impact assessment, agrolandscapes, etc.).
- 2) Landscape-geophysical element – Includes geophysical parameters of natural-territorial complexes (NTC): the amount of geographic masses (phytomass, aeromass, lithomass, pedomass, mortmass of zooass), productivity, energy, etc.
- 3) Landscape-geochemical element – Includes the chemical composition of geomasses (containing chemical elements).
- 4) Landscape-ecological element – Includes the degree of anthropogenic impact on landscapes and an assessment of the environmental impact.
- 5) Landscape planning element – Includes identifying and mapping the ecological, self-healing, recreational, and cultural functions of the landscape.
- 6) Landscape management element – Includes landscape assessment and determination of its behavioral (ethological) trajectory.
- 7) Landscape monitoring element – includes monitoring the variability of landscape-ecological and landscapeethological conditions.

The Georgian Landscape Geographic Information System (GIS) is a heuristic spatio-temporal model that is a continuously updated open system.