

Geographical Potential and Prospects for Regional Development of the Ganja-Dashkasan Economic Region

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Abstract

The Ganja-Dashkasan Economic Region has significant natural-resource, agricultural, industrial, transport, and recreational potential. The aim of the study is to provide a comprehensive geographical assessment of the region's potential and to identify prospects for its spatial development. Based on comparative-geographical, systemic-structural, and resource-geographical approaches, the study examines natural resources, industry, agriculture, transport, tourism, and the main territorial constraints. It has been established that the prospects for sustainable development of the region are associated with economic diversification, rational use of natural resources, deep processing of raw materials, modernization of agriculture, development of tourism, and improvement of infrastructure. It is proposed to consider Ganja as a regional urban core functionally connected with the mining, agricultural, and recreational areas of the region.

Keywords: Ganja-Dashkasan Economic Region, geographical potential, regional development, natural resources, spatial structure, agriculture, industry, tourism, transport, sustainable development.

Introduction

Modern regional development is increasingly determined by the characteristics of the territorial organization of natural resources, population, economic activity, and infrastructure. In this regard, economic regions should be considered not only as administratively defined territories, but also as complex geographical systems in which natural and socio-economic components are in constant interaction.

The geographical specificity of the region is primarily associated with the combination of lowland and mountainous territories. This location determines significant differences in natural conditions, land-use patterns, population distribution, and economic specialization. The lowland and foothill territories have considerable agricultural potential, whereas the mountainous areas are characterized by a rich mineral-resource base and recreational resources.

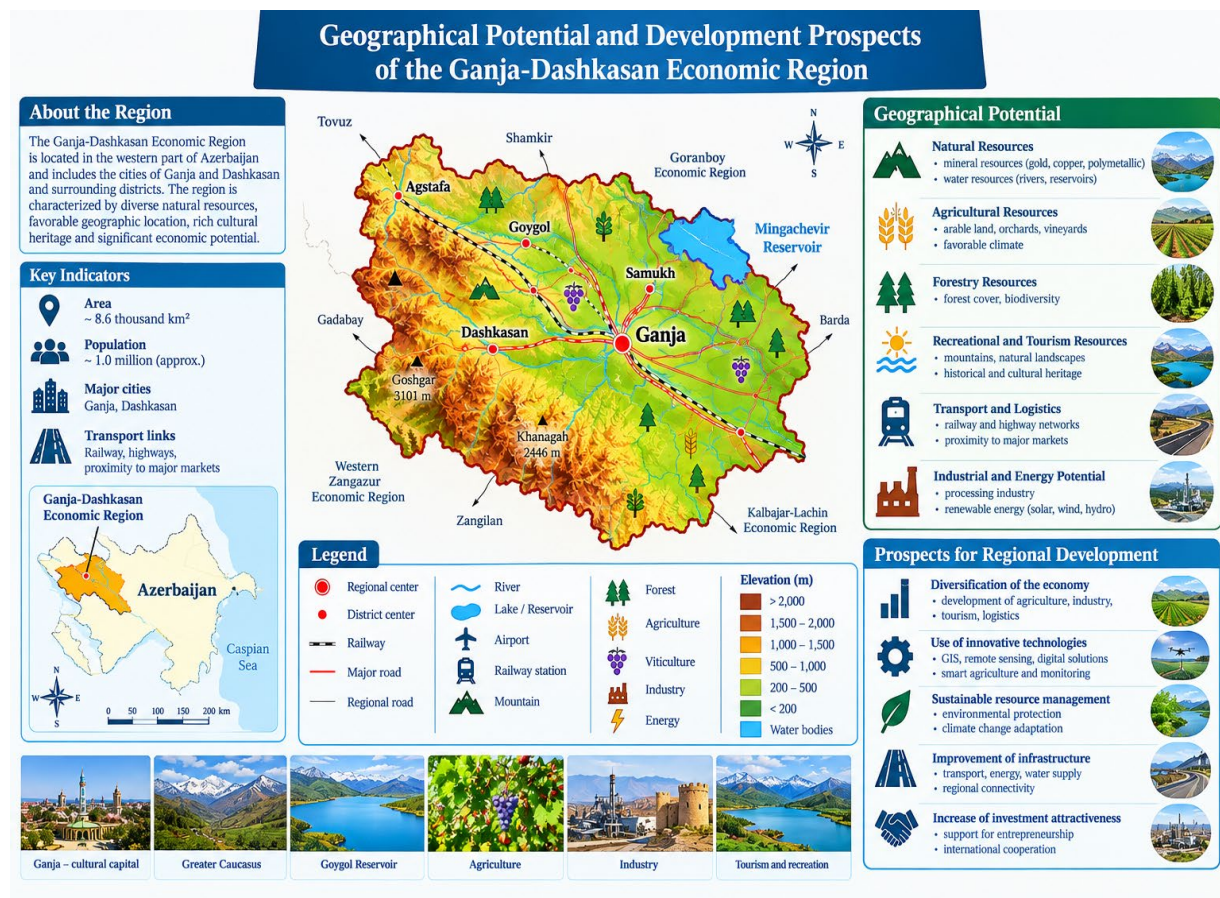


Figure 1. Geographical Potential and Development Prospects of the Ganja-Dashkasan Economic Region

Materials and Methods

The study is based on a comprehensive geographical approach, which makes it possible to consider the natural and socio-economic components of the Ganja-Dashkasan Economic Region as an interconnected territorial system.

The main sources of information were official statistical materials of the State Statistical Committee of the Republic of Azerbaijan, including the statistical publication “Regions of Azerbaijan”, which contains data on the country’s economic regions, cities, and districts [1]. In addition, data from statistical yearbooks on industry, agriculture, transport, tourism, the environment, and socio-economic development were used [2-6].

- Modern studies of the agricultural potential of the region are also based on the application of geographic information technologies and Earth observation data. In particular, the use of Google Earth Engine and GIS has made it possible to assess the condition of agricultural lands and spatial changes in land use in the Ganja-Dashkasan Economic Region [7].

The methodological framework of the study includes the following main stages:

- analysis of the geographical location of the region;
- assessment of the natural-resource potential;
- identification of the main types of economic specialization;
- analysis of the spatial structure of industry and agriculture;
- assessment of the transport and tourism-recreational potential;
- identification of the main territorial constraints;
- determination of promising directions for regional development.

To identify the functional differences within the territory, a comparative-geographical approach was used. Particular attention was paid to the interrelationship between natural resources, infrastructure, settlement patterns, and economic specialization.

The Ganja-Dashkasan Economic Region is characterized by a complex natural-geographical structure. Its territory includes lowland, foothill, and mountainous landscapes, which create significant spatial heterogeneity in natural conditions.

The region's location in the western part of Azerbaijan provides connections with the central and western territories of the country. Ganja serves as an important hub for transport and economic links, while the mountainous areas of Dashkasan and Goygol are characterized by more complex terrain and specific conditions for economic development.

Natural differentiation directly affects the structure of land use. Lowland areas have relatively favorable conditions for agricultural production, whereas in mountainous areas, forest, pasture, mineral, and recreational resources play an important role.

The vertical zonation of natural complexes is of particular importance. Changes in elevation are accompanied by changes in temperature, precipitation patterns, soil and vegetation cover, and land-use conditions. This creates prerequisites for the territorial specialization of agriculture and recreational activities.

Thus, the natural diversity of the region should be considered one of the main factors of its geographical potential.

Mineral-Resource and Industrial Potential

Mineral resources are one of the most distinctive features of the Ganja-Dashkasan Economic Region. The Dashkasan mining and industrial zone is of particular importance, historically associated with the extraction of iron ore and other types of mineral raw materials.

Mineral resources have a significant influence on the spatial structure of industry and determine the specialization of individual mountainous areas. However, the modern model of resource-based development should take into account not only the volume of extraction but also the efficiency of subsequent processing of raw materials.

From a geographical perspective, the formation of production chains is considered promising:

Extraction → beneficiation → processing → industrial production → transportation → market.

Such an approach makes it possible to increase the added value created within the region and reduce the territory's dependence on the export of unprocessed raw materials.

At the same time, mining activities are accompanied by potential impacts on land resources, water systems, and natural landscapes. Therefore, further industrial development should provide

for environmental monitoring, reclamation of disturbed lands, and the introduction of resource-efficient technologies.

The industrial potential of Ganja is characterized by a more diversified structure. The city performs the functions of a major production and service center, concentrating enterprises from various sectors, labor resources, educational institutions, and infrastructure [1, 3].

As a result, a spatial interrelationship is formed between the resource territories of Dashkasan and the industrial-service center of Ganja.

Agricultural Potential

Agriculture is one of the most important components of the region's geographical potential. The lowland and foothill territories have favorable conditions for the development of crop production, livestock farming, horticulture, and other areas of agricultural production.

According to official statistical materials, agriculture occupies a significant position in the economic structure of the Goranboy, Samukh, and Goygol districts [1, 4].

The natural heterogeneity of the territory determines differences in agricultural specialization. In lowland areas, cereals, vegetable production, and fodder production are more significant, whereas foothill areas have favorable conditions for horticulture, viticulture, and livestock farming.

A recent study of agricultural lands in the Ganja-Dashkasan Economic Region demonstrated the potential of using satellite data, GIS, and Google Earth Engine to assess the condition of agricultural land and the spatial dynamics of land use [7].

The use of remote sensing data makes it possible to conduct regular monitoring of:

- vegetation cover condition;
- degree of agricultural land utilization;
- spatial structure of crops;
- land-use changes;
- impacts of droughts and other climatic factors;
- pasture condition.

Therefore, the digitalization of agriculture can become one of the most promising directions for regional development.

The rational use of water resources is of particular importance. Under conditions of climate variability, improving irrigation efficiency, reducing water losses, and introducing modern monitoring methods should be considered important elements of agricultural policy.

Tourism and Recreational Potential

The Ganja-Dashkasan Economic Region has significant natural and cultural resources for tourism development.

Mountain landscapes, forest areas, lakes, natural complexes, and climatic characteristics create favorable conditions for the development of ecological, mountain, recreational, and educational tourism.

The territory of the Goygol district is of particular importance, possessing significant natural and recreational potential. The combination of mountain landscapes, forests, and lakes creates an attractive environment for ecological and recreational tourism.

Dashkasan also has opportunities for the development of mountain and geological tourism, particularly in areas with distinctive geomorphological and mining-related sites.

Another important direction is Naftalan, whose natural therapeutic resources have contributed to the formation of a specialized health and wellness tourism center.

Recent studies emphasize the importance of tourism for the socio-economic development of the Ganja-Dashkasan Region and the need to improve the planning and organization of tourism activities [8].

From a geographical perspective, the creation of an interconnected tourism and recreational system, rather than the isolated exploitation of individual tourist sites, represents a promising approach.

It may include:

Ganja → cultural and historical tourism;

Goygol → ecological and mountain tourism;

Dashkasan → mountain and geotourism;

Naftalan → health and wellness tourism;

Goranboy and Samukh → rural and agrotourism.

Such spatial integration will make it possible to increase the length of tourists' stays and redistribute tourist flows among different areas of the region.

Transport and Geographical Potential

Transport accessibility is an important condition for the territorial integration of the Ganja-Dashkasan economic region.

Ganja has a favourable location in relation to the main transport routes of the western part of Azerbaijan. The development of road and railway connections creates prerequisites for the formation of a regional transport and logistics hub [5].

Transport infrastructure has a direct impact on the development of industry, agriculture, and tourism. For industry, it determines the cost of transporting raw materials and finished products; for agriculture, it determines the possibility of rapid transportation of perishable products; and for tourism, it determines the accessibility of natural and cultural attractions.

Improving the transport connectivity of mountainous areas is particularly important. For Dashkasan and certain parts of the Goygol district, the development of local road infrastructure may have a multiplier effect, as it simultaneously improves access to industrial, tourist, and social facilities.

In the long term, it is advisable to develop a multimodal transport system integrating road, railway, and air transportation.

Spatial Structure of the Economy

From a geographical perspective, the Ganja-Dashkasan economic region has a pronounced functional heterogeneity.

Five interconnected territorial components can be conditionally distinguished.

The first component - Ganja

The city is the main urban and economic centre of the region. Industry, trade, education, scientific activities, services, and transport infrastructure are concentrated here.

The second component - Dashkasan.

The territory is characterized by mountainous terrain, mineral and raw material potential, and prospects for mountain tourism.

The third component - Goygol.

It combines agricultural and recreational specialization.

The fourth component - Goranboy and Samukh.

These are predominantly agricultural territories with potential for crop production, livestock farming, and the processing of agricultural raw materials.

The fifth component - Naftalan.

A specialized health and recreational centre.

This structure makes it possible to consider the region as a system of functionally interconnected territories.

For example, agricultural products from Goranboy and Samukh can be sent to Ganja for processing; Ganja can provide peripheral territories with educational, medical, and service functions; and tourist routes can connect Ganja, Goygol, Dashkasan, and Naftalan.

Therefore, the prospective development model should be based on territorial complementarity rather than on the isolated development of individual administrative units.

Geographical Constraints on Development

Despite its considerable potential, the development of the region faces a number of constraints.

The first is the complex spatial heterogeneity of the territory. Mountainous areas possess significant natural resources; however, their economic development is complicated by terrain, transport accessibility, and natural hazards.

The second constraint is the dependence of certain territories on extractive industries. Such specialization may create economic and environmental risks in the event of changes in demand for raw materials.

The third factor is climate change and the associated risks to agriculture and water resources. Rising temperatures, changes in precipitation patterns, and an increasing frequency of extreme weather events may affect the productivity of agricultural lands.

The fourth constraint is the uneven spatial distribution of economic activity. The concentration of a significant proportion of production, educational, and service functions in Ganja may intensify disparities between the urban centre and peripheral territories.

Therefore, an important direction of regional policy should be the development of secondary centres of economic activity and the strengthening of their transport and functional connections with Ganja.

Prospects for Regional Development

The prospects for the Ganja-Dashkasan economic region are primarily associated with the diversification of its economic structure and more efficient utilization of its geographical potential.

One of the main directions should be increasing the degree of mineral raw material processing. The development of technological chains from extraction to finished products will make it possible to improve the economic efficiency of natural resource use.

The second direction is related to the modernization of agriculture. The use of satellite monitoring, GIS, and digital technologies will make it possible to improve the efficiency of land and water resource use [7].

The third direction is the formation of a tourism and recreation cluster integrating the natural, cultural, and therapeutic resources of the region [8].

The fourth direction is related to the development of Ganja as a regional centre for science, education, innovation, logistics, and services.

The fifth direction is to improve the transport connectivity of peripheral territories.

The sixth direction is the greening of economic activities, including the restoration of degraded lands, monitoring of natural resources, and the implementation of resource-saving technologies.

Spatial planning based on GIS can play an important role in implementing these directions.

Conceptual Model of Geographical Development

Taking into account the identified characteristics, the prospective development model of the region can be presented as the following sequence:

This model implies a transition from the simple exploitation of resources to the formation of a territorial system with higher added value.

An important principle is the interconnectedness of individual components. Natural resources should support industry and agriculture, infrastructure should connect production and tourism centres, while scientific and educational potential should ensure technological modernization.

Table 1. SWOT Analysis of the Ganja-Dashkasan Economic Region

Strengths	Weaknesses
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Favourable geographical location	Spatial heterogeneity
Rich mineral and raw material base	Dependence of certain territories on the raw materials sector
Major urban centre — Ganja	Concentration of some functions in a single centre
Agricultural potential	Dependence of agriculture on water availability
Significant recreational potential	Uneven transport accessibility
Naftalan's balneological potential	Environmental risks associated with certain types of economic activity
Opportunities	Threats
Development of tourism clusters	Climate change
Digitalization of agriculture	Land degradation
Deep processing of raw materials	Environmental impact of extraction
Development of logistics	Increasing territorial disparities
Development of small and medium-sized businesses	Dependence on external markets
GIS monitoring of natural resources	Natural and technological risks

Conclusion

The Ganja-Dashkasan economic region possesses significant and multifunctional geographical potential, based on natural resource diversity, a mineral and raw material base, agricultural territories, a favourable transport and geographical position, tourism and recreational resources, and human capital.

The main feature of the region is the high spatial differentiation of natural and socio-economic conditions. Ganja performs the functions of the main urban, industrial, transport, and educational centre, while Dashkasan, Goygol, Goranboy, Samukh, and Naftalan have different types of functional specialization.

The analysis shows that the further development of the region should be based on the principles of spatial integration and diversification. Of particular importance are the deep

processing of mineral raw materials, modernization of agriculture, development of tourism, improvement of transport infrastructure, and application of digital geoinformation technologies.

A promising model is one in which Ganja forms the regional economic and innovation core; Dashkasan specializes in mining-industrial and recreational development; Goygol combines agricultural and tourism functions; Goranboy and Samukh develop agricultural-industrial specialization; and Naftalan maintains and expands its health and wellness orientation.

Thus, the long-term competitiveness of the Ganja-Dashkasan economic region will depend not so much on increasing the volume of exploitation of individual resources as on its ability to integrate natural, industrial, agricultural, tourism, infrastructure, and human potential into a unified spatial system.

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