

ANALYSIS AND ASSESSMENT OF THE CURRENT STATE OF THE POTENTIAL OF GORNO-BADAKHSHAN AUTONOMOUS REGION FOR THE FORMATION OF TRANSPORT AND LOGISTICS CENTERS

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This article analyzes and assesses the current state of the transport and logistics potential of the Badakhshan Autonomous Region (GBAO) of the Republic of Tajikistan, with the aim of determining the possibilities for the formation of transport and logistics centers (TLCs). The assessment is based on six interrelated components of regional potential: production, freight-handling, infrastructure, transit, investment, and labor potential. Based on the results of this study, the specific features of GBAO have been considered, more precisely, its geostrategic location, international roads and border crossings, the Ishkashim Free Economic Zone, indicators of gross regional product, trade turnover, and traffic volume. Particular attention is paid to the geostrategic location of GBAO, its borders with Afghanistan, China, and Kyrgyzstan, the international AH-66 road corridor, the Kulma border crossing, the Ishkashim Free Economic Zone, the Murghab border terminal, gross regional product, retail trade turnover, freight volumes, employment, wages, and migration. The study demonstrates that the growth of regional economic indicators alone cannot serve as sufficient evidence for establishing a TLC; the decision should be based on the interaction of freight demand, transit opportunities, infrastructure capacity, investment activity, and labor availability. Khorog, Murghab, and Ishkashim are identified as priority areas for further technical and economic assessment of specialized logistics facilities. Based on the results obtained, the conclusion substantiates the need to create transport and logistics centers in GBAO to improve cargo flows, increase regional connectivity, and support sustainable economic development.

Keywords: transport and logistics centers, transport and logistics potential, GBAO, transport infrastructure, freight transportation, logistics, international transport corridors, cross-border trade, Ishkashim Free Economic Zone, regional development.

АНАЛИЗ И ОЦЕНКА СОВРЕМЕННОГО СОСТОЯНИЯ ПОТЕНЦИАЛА ГБАО ДЛЯ ФОРМИРОВАНИЯ ТРАНСПОРТНО-ЛОГИСТИЧЕСКИХ ЦЕНТРОВ

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В статье анализируется и оценивается современное состояние транспортно-логистического потенциала Горно-Бадахшанской автономной области (ГБАО) Республики Таджикистан, с целью определения возможностей создания транспортно-логистических центров (ТЛЦ). Оценка базируется на шести взаимосвязанных компонентах регионального потенциала: производственном, грузоперерабатывающем, инфраструктурном, транзитном, инвестиционном и трудовом. В ходе исследования рассмотрены специфические особенности ГБАО, в частности: геостратегическое положение, международные автомобильные дороги и пограничные переходы, свободная экономическая зона «Ишкашим», а также показатели валового регионального продукта, торгового оборота и объемов перевозок. Особое внимание уделено геостратегическому расположению ГБАО, границам с Афганистаном, Китаем и Кыргызстаном, международному транспортному коридору АН-66, пограничному переходу «Кульма», СЭЗ «Ишкашим», пограничному терминалу «Мургаб», а также таким показателям, как валовой региональный продукт, оборот розничной торговли, объемы грузоперевозок, занятость, заработная плата и миграция. Исследование показывает, что рост экономических показателей региона сам по себе не является достаточным основанием для создания ТЛЦ; решение должно приниматься с учетом взаимодействия спроса на грузоперевозки, транзитных возможностей, пропускной способности инфраструктуры, инвестиционной активности и наличия трудовых ресурсов. В качестве приоритетных зон для проведения дальнейшей технико-экономической оценки размещения специализированных логистических объектов определены Хорог, Мургаб и Ишкашим. На основе полученных результатов обосновывается необходимость создания транспортно-логистических центров в ГБАО для оптимизации грузопотоков, повышения связности региона и обеспечения устойчивого экономического развития.

Ключевые слова: транспортно-логистические центры, транспортно-логистический потенциал, ГБАО, транспортная инфраструктура, грузовые перевозки, логистика, международные транспортные коридоры, приграничная торговля, Ишкашимская свободная экономическая зона, региональное развитие.

ТАҲЛИЛ ВА БАҲОДИҲИ ҲОЛАТИ КУНУНИИ ИҚТИДОРИ ВМКБ ЧИҲАТИ ТАШАККУЛИ МАРКАЗҲОИ НАҚЛИЁТИЮ ЛОГИСТИКӢ

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Дар мақола ҳолати муносири иқтисодии нақлиёт-логистикӣ Вилояти Мухтори Кӯҳистони Бадахшон (ВМКБ)-и Ҷумҳурии Тоҷикистон, бо мақсади муайян кардани имкониятҳо барои таъсиси марказҳои нақлиёт ва логистика (МНЛ) таҳлил ва арзёбӣ карда мешавад. Арзёбӣ ба шаш ҷузъи ба ҳам алоқаманди иқтисодии минтақавӣ асос ёфтааст: истеҳсолот, коркарди бор, инфрасохтор, транзит, сармоягузорӣ ва қувваи корӣ. Дар таҳқиқот хусусиятҳои ҳосили ВМКБ, аз ҷумла мавқеи геостратегӣ, роҳҳои автомобилгарди байналмилалӣ ва гузаргоҳҳои марзӣ, Минтақаи озоди иқтисодии Ишқошим, инчунин нишондиҳандаҳои маҳсулоти умумии минтақавӣ, гардиши тиҷорат ва ҳаҷми интиқол баррасӣ мешаванд. Таваҷҷӯҳи махсус ба мавқеи геостратегӣ, марзҳои он бо Афғонистон, Чин ва Қирғизистон, долони байналмилалӣ нақлиёти АН-66, гузаргоҳи марзии Кулма, Минтақаи озоди иқтисодии Ишқошим, терминали марзии Мурғоб, инчунин нишондиҳандаҳои маҳсулоти умумии минтақавӣ, гардиши чакана, ҳаҷми боркашонӣ, шугъл, музди меҳнат ва муҳочират рағбати минтақавӣ карда шудааст. Таҳқиқот нишон медиҳад, ки афзоиши нишондиҳандаҳои иқтисодии минтақа танҳо барои таъсиси МТК асосноккунии кофӣ нест; Қарор бояд бо назардошти таъсири мутақобилаи талабот ба боркашонӣ, имконоти транзитӣ, иқтисодии инфрасохтор, фаъолияти сармоягузорӣ ва мавҷудияти қувваи корӣ қабул карда шавад. Хоруг, Мурғоб ва Ишқошим ҳамчун самтҳои афзалиятнок барои таҳқиқоти минбаъдаи имконпазирии ҷойгиркунии иншооти махсуси логистикӣ муайян карда шуданд. Бар асоси натиҷаҳои бадастомада, зарурати таъсиси марказҳои нақлиёт ва логистикӣ дар ВМКБ барои беҳтар кардани ҷараёни боркашонӣ, беҳтар кардани робитаҳои минтақавӣ ва таъмини рушди устувори иқтисодӣ асоснок карда шуд.

Калидвожаҳо: марказҳои нақлиёт-логистикӣ, иқтисодии нақлиёт-логистикӣ, ВМКБ, инфрасохтори нақлиётӣ, боркашонӣ, логистика, долонҳои байналмилалӣ нақлиётӣ, савдои наздисарҳадӣ, Минтақаи озоди иқтисодии Ишқошим, рушди минтақавӣ.

Introduction

In the context of economic globalization and the development of regional integration processes, the development of transport and logistics infrastructure is one of the key factors in increasing the competitiveness of the state economy. The Government of the Republic of Tajikistan takes a particular attention to the development of transport infrastructure, improvement of international transport corridors, and formation of logistics centers. These processes are considered important instruments for strengthening economic integration among the regions of the country and improving access to international markets. In this context, GBAO has particular geostrategic importance due to its geographical location and borders with Afghanistan, the People's Republic of China, and the Kyrgyz Republic. The international AH-66 road corridor, the Kulma border crossing, and the Ishkashim Free Economic Zone create favorable conditions for the development of transit transportation, cross-border trade, and logistics services. At the same time, the mountainous terrain of GBAO, the limited size of its population, the concentration of settlements at considerable distances from each other, the dependence on road transport, and persistent negative net migration create specific constraints for the formation of logistics infrastructure.

Previous studies have considered the role of transport logistics in the development of the national economy and the rational location of transport and logistics centers [1, 2]. However, the transport and logistics potential of GBAO has not yet been sufficiently examined through a systematic assessment of its economic, infrastructure, transit, investment, freight-handling, and labor components. This constitutes the research gap addressed in this study. The purpose of this study is to analyze and assess the current transport and logistics potential of GBAO and to identify the main conditions and constraints affecting the formation of transport and logistics centers in the region.

Materials and Methods

The main purpose of this study is to consider and evaluate the transport and logistics potential of GBAO using economic methods and substantiate the necessity and possibility of forming transport and logistics centers in the region. The object of the study is the transport and logistics potential of GBAO as a combination of resources and conditions determining the possibility of establishing and operating transport and logistics centers.

The subject of the study is a set of economic, transport, infrastructure, investment, labor, and transit indicators that characterize the potential of the region for logistics development.

The study uses statistical, comparative, structural, and descriptive methods. Statistical data were obtained primarily from the Statistical Yearbook of the Republic of Tajikistan [3]. For the purposes of the study, the transport and logistics potential of GBAO is divided into six interrelated components: production potential; freight-handling potential; infrastructure potential; transit potential; investment potential; labor potential.

The creation of transport and logistics centers is one of the strategic directions for the development of the transport industry in the Republic of Tajikistan. The analysis and assessment of the potential of regions using the potentials method is a methodology of scientific substantiation, which makes it possible to evaluate each region of the country based on a set of quantitative and qualitative indicators.

The main purpose of this assessment is to determine the degree of readiness of each region for the correct location of transport and logistics centers. This process makes it possible to identify regions with great transport and logistics potential and identify unused resources. The potential method also provides an opportunity to develop and present specific practical recommendations for the Gorno-Badakhshan Autonomous Region. The basis of the potentials method is the identification of the following types of potentials in the region: production capacity - a set of products produced and consumed in the region; load capacity - the volume and directions of cargo transportation; infrastructure capacity - the condition of roads, railways, airports; transit capacity - geographical location and border crossings; investment potential - attracted investments in the transport industry; labor capacity - resources of specialists in the transport industry.

General Characteristics and Transport Position of GBAO

The Gorno-Badakhshan Autonomous Region (GBAO) is one of the largest regions and an administrative unit of the Republic of Tajikistan, located in the eastern part of the country and comprising

most of the country's territory. The area of the region is 62,9 thousand square km (more than 44% of the territory of the Republic of Tajikistan) is equal, most of it is occupied by mountains. The population of GBAO on January 01, 2025 was 234,8 thousand people. GBAO has both important geostrategic significance and wide opportunities for the formation of transport and logistics infrastructure. The region borders the following states: the Islamic Republic of Afghanistan, China and the Kyrgyz Republic. The existence of such border links creates an important basis for the organization of international transportation and transit. GBAO includes 8 cities and districts, its center is the city of Khorog. It should be noted that the Kulma border crossing is located in this area, and a large amount of cargo from the People's Republic of China enters Tajikistan through this crossing. A large number of transit freight traffic also passes through this international corridor.

Transit Potential

Transit potential is one of the strongest components of GBAO's transport and logistics potential. The Kulma border crossing is located in the region and provides an important transport connection between Tajikistan and the People's Republic of China. The international AH-66 road corridor - Dushanbe - Kulob - Khorog - Murghab - Kulma - passes through GBAO (Fig.1).



Figure 1—International highway corridor AH-66: Dushanbe-Kulyab-Khorog – Murghab –Kulma
Source: compiled by the authors based on official road-network and cartographic data.

The transit potential of the region should therefore be considered not simply in terms of road availability but as the possibility of providing a complete range of logistics services, including cargo reception, temporary storage, consolidation, redistribution, vehicle servicing, documentation, customs operations, and coordination of freight flows.

Infrastructure Potential

In recent years, the State and the Government of the Republic of Tajikistan have taken a special interest in the formation and development of transport and logistics infrastructure, reconstruction and reconstruction of highways in this region, and are taking all measures to eliminate these problems and create favorable lands for the creation of transport and logistics centers. One of the important problems of

this region is the lack of roads of international importance, hence the effective operation of the road transport sector. According to statistics, out of 14307 thousand km of highways, this area includes 2739 km, 1276 km of international roads, 384 km of national roads and 1079 km of local roads. Depending on the development of regional potential, geographical nature, socio-economic indicators, it is possible to determine a specific type of logistics center in the region. Therefore, the aforementioned factors may serve as a scientific foundation for examining the issue under consideration.

Labor Potential

The labor potential of GBAO has both positive and limiting characteristics. As noted above, the population of the Gorno-Badakhshan Autonomous Region (GBAO) was approximately 235000 at the beginning of 2024. The analysis of employment and migration indicators in GBAO shows that the number of unemployed has been decreasing from year to year in recent years. In general, the unemployment rate has decreased by 50-60 percent over the past six years. Also, one of the indicators of positive dynamics is wages, which increased from 1200 somoni in 2019 to 2051 somoni in 2024. But the migration rate is estimated as negative, which is alarming given the small population in the region. Thus, the formation of transport and logistics centers leads to the creation of new jobs, the attraction of new specialists and the development of transport infrastructure.

Table 1 – Employment and Migration Indicators in the Gorno-Badakhshan Autonomous Region (GBAO)

Indicator	2019	2020	2021	2022	2023	2024	2024 as % of 2023
Number of unemployed men, thousand persons	2,2	2,2	2,0	2,4	1,2	1,0	83,3
Number of unemployed women, thousand persons	2,9	2,3	2,7	3,1	2,5	1,2	48,0
Total number of unemployed, thousand persons	5,1	4,5	4,7	5,5	3,7	2,2	59,5
Number of in-migrants, thousand persons	0,7	0,6	0,5	0,6	0,6	0,5	83,3
Number of out-migrants, thousand persons	1,9	1,6	1,3	1,4	1,2	1,1	91,7
Net migration, thousand persons	-1,2	-1,0	-0,8	-0,8	-0,6	-0,6	100,0
Average monthly nominal wage	1200,4	1347,4	1459,3	1636,2	1847,3	2051,3	111,0

Source: Compiled by the author.

Economic and Market Potential

GBAO is a mountainous region of the country with a cold climate, and agricultural production is at a low level compared to other regions. Despite such unfavorable conditions, the region has established the production and cultivation of a number of agricultural products. For example, oats, barley, wheat, peas, potatoes, carrots, cabbage, onions, and other foods [2-6].

As of 01.01.2024, more than 18 thousand business entities were registered in GBAO, including 2110 legal entities and more than 16 thousand individual entrepreneurs. Not to mention that investments in various sectors of the national economy increased significantly in GBAO in 2019-2024. According to official statistics, GBAO accounted for 257.4 million somoni in 2019, and in 2023 this figure amounted to 1,256.7 million somoni (almost four times more). In recent years, the range of GBAO regional products has been growing and influencing the development of other industries, which is becoming a favorable basis for the formation of transport and logistics infrastructure. Despite such circumstances, the region's share in the country's gross domestic product is significant (Fig.2).

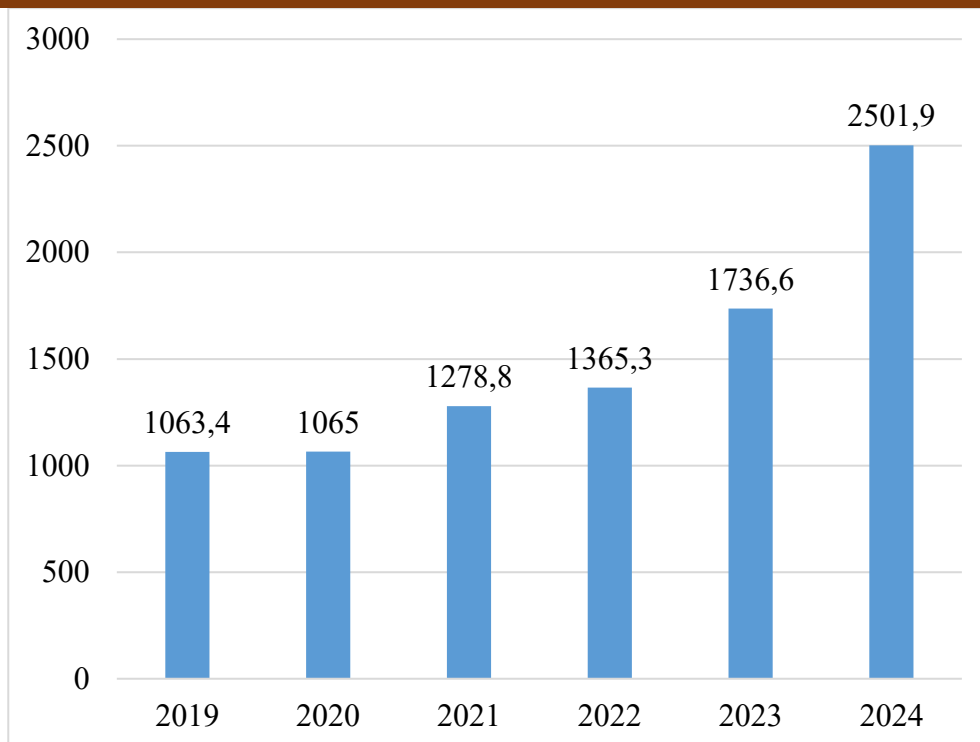


Figure 2 – Gross regional product in GBAO, 2019–2024, million somoni

Source: calculated by the authors based on the Statistical Yearbook of the Republic of Tajikistan (2025).

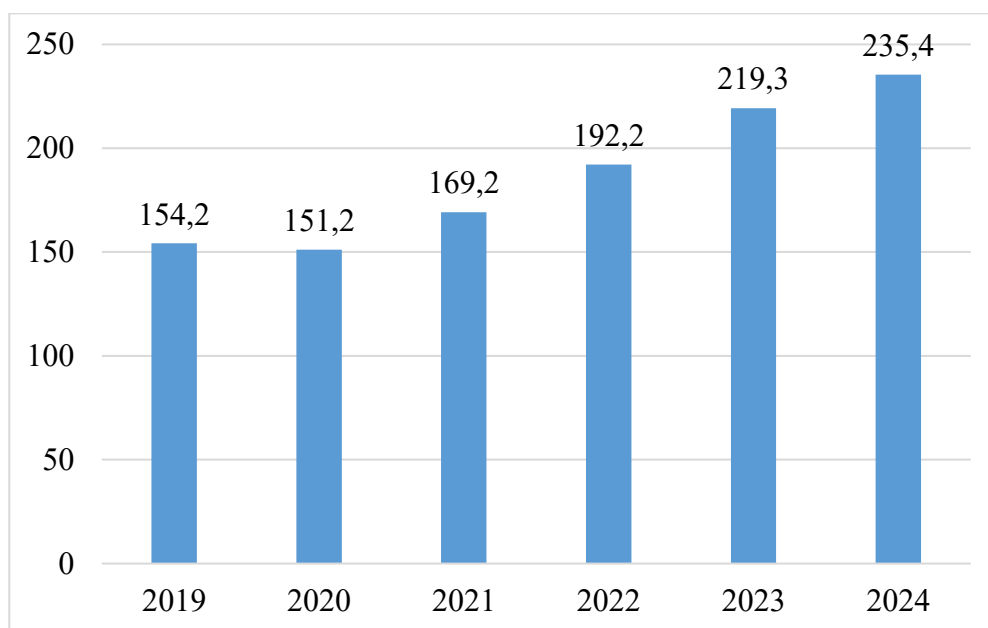


Figure 3 – Total retail trade turnover in GBAO, 2019–2024, million somoni

Source: calculated by the authors based on the Statistical Yearbook of the Republic of Tajikistan (2025)

As it can be seen from the figure, the total volume of regional products has tended to grow in recent years and in 2024 reached 2501.9 million somoni, which is 44.1% more than last year. In 2023, it increased by 27.17% compared to the previous year. In other words, this indicates that the gross regional product is growing and is a sufficient basis for justifying the creation of transport and logistics centers.

It should be noted that the set of regional products reflects the development of the manufacturing industry and determines the level of service. Another indicator that determines the process of reproduction, an indicator of the level of consumption, the development of the domestic market, is the turnover. This indicator is on the path of growth and development in this region and is becoming a favorable basis for the construction of transport and logistics centers. Figure 3 shows the total volume of retail turnover in GBAO for 2019-2024.

As can be seen from the figure, the total volume of retail turnover in GBAO is growing from year to year and affects the formation of transport and logistics infrastructure and the development of the country's economy. This figure has increased in recent years, increasing by 14.1% in 2023 compared to 2022 and by 7.1% in 2024 compared to 2023 [3-5].

As we know, GBAO is a harsh mountainous region. This factor negatively affects the accessibility of other modes of transport. In this regard, only road transport is effective in the region, and transport and logistics services both domestically and abroad are provided by road. One of the indicators of transport performance, which is crucial and fundamental for the creation of a transport and logistics center, is the volume of traffic. This indicator in this area can be achieved only if there are vehicles, the condition of which is shown in Figure 4.

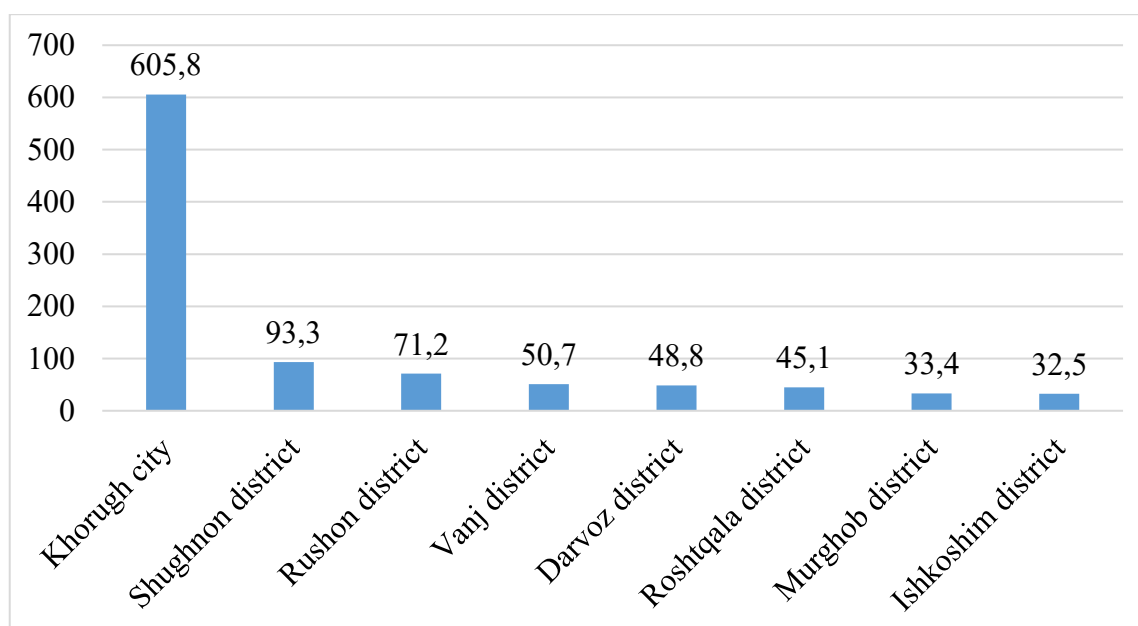


Figure 4 – Freight shipments by districts of GBAO in 2024, thousand tons

Source: calculated by the authors based on the Statistical Yearbook of the Republic of Tajikistan (2025)

As can be seen from the figure, the administrative-territorial center of Khorog region is developing in the direction of cargo transportation, the volume of which reached 605.8 thousand tons in 2024. In other regions of the region, this indicator is also developing, which creates favorable conditions for the formation of transport and logistics centers. In short, GBAO's market and logistics potential shows that the development of various transport and logistics centers provides a significant boost to the development of the region's national economy.

Discussion

It should be noted that terminals and warehouses play a key role in the establishment and development of freight transportation and become the basis for the creation of a new logistics and transport infrastructure. GBAO, as an area located on a transit route, the state of diverse and modern infrastructure is becoming the basis for the development of the region. One of these terminals is the border terminal in Murghab district of GBAO, through which the process of customs clearance, reception and dispatch of goods is carried out. Another important transport and logistics facility as a favorable base is the free economic zone. A similar infrastructure operates in Ishkashim district of the region. Ishkashim free

economic zone with an area of 200 hectares is located on the territory of the district, which has significant tax and customs privileges [4-7].

Thus, Khorog, Murghab, and Ishkashim should not be regarded as final and definitive TLC locations at this stage. Rather, they should be considered priority areas for further technical, economic, and spatial assessment. The final selection of locations should subsequently be based on freight-flow forecasts, transport costs, distance to markets and border crossings, infrastructure condition, warehouse requirements, seasonal accessibility, investment requirements, and labor availability.

Conclusions and recommendations

The analysis demonstrates that GBAO possesses a significant basis for the development of transport and logistics infrastructure. The main advantages are associated with the region's geostrategic position, borders with three neighboring countries, the AH-66 international transport corridor, the Kulma border crossing, the Ishkashim Free Economic Zone, and existing terminal infrastructure.

The assessment of the six components of transport and logistics potential shows that transit and infrastructure potential are among the most important components for the development of logistics in GBAO. Economic potential also demonstrates positive dynamics, reflected in the growth of gross regional product, retail trade turnover, investment activity, and freight transportation.

In 2024, the gross regional product of GBAO reached 2,501.9 million somoni, while freight transportation in Khorog reached 605.8 thousand tons. These indicators demonstrate the existence of an economic and transport basis for the development of logistics services. However, they should not be interpreted independently as sufficient evidence for the construction of TLCs. At the same time, the region faces significant constraints, including mountainous terrain, dependence on road transport, limited population, seasonal accessibility, and persistent negative net migration. These factors should be incorporated into the planning and economic assessment of future logistics facilities.

Based on the combined assessment, Khorog, Murghab, and Ishkashim are proposed as priority areas for further investigation of TLC locations. Khorog is more suitable for regional distribution and consolidation functions; Murghab has potential for transit and border-terminal functions; and Ishkashim has potential for cross-border, production, and investment-related logistics.

For the practical development of TLCs in GBAO, the following measures are recommended:

- to analyze freight flows separately by domestic, import, export, and transit directions;
- to assess the technical condition, capacity, and seasonal accessibility of the principal road corridors;
- to integrate existing logistics facilities, particularly the Murghab border terminal and Ishkashim Free Economic Zone, into a coordinated regional logistics system;
- to develop technical and economic feasibility studies for possible TLC locations in Khorog, Murghab, and Ishkashim;
- to establish training and retraining programs for specialists in transport, logistics, customs, warehouse management, and digital technologies;
- to introduce digital information systems for freight tracking, transport coordination, warehouse management, and interaction with customs services;
- to develop an integral quantitative model for ranking potential TLC locations as the next stage of research.

Further research should focus on developing an integral transport and logistics potential index based on normalized indicators and scientifically justified weighting coefficients. Such a model would make it possible to compare the administrative districts of GBAO quantitatively and determine the most appropriate locations for different types of transport and logistics centers.

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