

THE MAIN CRITERIA FOR THE PLACEMENT OF TRANSPORT AND LOGISTICS CENTERS IN THE REPUBLIC OF TAJIKISTAN

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The article examines the main criteria for the placement of transport and logistics centers in the Republic of Tajikistan. Taking into account the geographical, economic, demographic, and transport characteristics of the country, the factors influencing the selection of locations for transport and logistics centers are analyzed. The main criteria include the geographical position of the region, the level of transport infrastructure development, freight flow volumes, industrial and agricultural potential, production and consumption volumes, export and import potential, population size, and opportunities for integration into international transport corridors. It is established that the application of a comprehensive set of these criteria makes it possible to objectively assess the suitability of individual territories for the placement of transport and logistics centers. The proposed criteria can be used as a scientific and methodological basis for selecting optimal locations for transport and logistics centers and developing the transport infrastructure of the Republic of Tajikistan.

Keywords: *transport and logistics centers, placement, placement criteria, transport infrastructure, freight flows, industrial and agricultural potential, logistics potential, international transport corridors, Republic of Tajikistan.*

КРИТЕРИЯҲОИ АСОСИИ ҶОЙГИРНАМОИИ МАРКАЗҲОИ НАҚЛИЁТИЮ ЛОГИСТИКӢ ДАР ШАРОИТИ ҶУМҲУРИИ ТОҶИКИСТОН

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Дар мақола масъалаи муайян намудани меъёрҳои асосии ҷойгирнамоии марказҳои нақлиётию логистикӣ дар Ҷумҳурии Тоҷикистон баррасӣ гардидааст. Бо дарназардошти хусусиятҳои ҷуғрофӣ, иқтисодӣ, демографӣ ва нақлиётӣ кишвар, омилҳои таъсиррасон ба интиҳоби макони ҷойгиршавии марказҳои нақлиётию логистикӣ таҳлил карда шудаанд. Меъёрҳои асосӣ, аз ҷумла мавқеи ҷуғрофӣ минтақа, сатҳи рушди инфрасохтори нақлиётӣ, ҳаҷми ҷараёнҳои боркашонӣ, иқтисодӣ саноатию аграрӣ, ҳаҷми истеҳсолот ва истеъмоли молу маҳсулот, иқтисодӣ содиротию воридотӣ, шумораи аҳоли ва имконияти пайвастишавӣ ба долонҳои байналмилалӣ нақлиётӣ муайян карда шудаанд. Муайян гардид, ки истифодаи маҷмӯи меъёрҳои мазкур имкон медиҳад, ки мутобиқати ҳудудҳои алоҳида ба талаботи ҷойгирнамоии марказҳои нақлиётию логистикӣ объективона баҳогузорӣ карда шавад. Меъёрҳои пешниҳодшуда метавонанд ҳамчун заминаи илмӣ-методӣ барои интиҳоби макони оптималии ҷойгирнамоии марказҳои нақлиётию логистикӣ ва рушди инфрасохтори нақлиётӣ дар Ҷумҳурии Тоҷикистон истифода шаванд.

Калидвожаҳо: *марказҳои нақлиётию логистикӣ, ҷойгирнамоӣ, меъёрҳои ҷойгирнамоӣ, инфрасохтори нақлиётӣ, ҷараёнҳои боркашонӣ, иқтисодӣ саноатию аграрӣ, иқтисодӣ логистикӣ, долонҳои байналмилалӣ нақлиётӣ, Ҷумҳурии Тоҷикистон.*

ОСНОВНЫЕ КРИТЕРИИ РАЗМЕЩЕНИЯ ТРАНСПОРТНО-ЛОГИСТИЧЕСКИХ ЦЕНТРОВ В УСЛОВИЯХ РЕСПУБЛИКИ ТАДЖИКИСТАН

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В статье рассматривается вопрос определения основных критериев размещения транспортно-логистических центров в Республике Таджикистан. С учетом географических, экономических, демографических и транспортных особенностей страны проанализированы факторы, влияющие на выбор мест размещения транспортно-логистических центров. Определены основные критерии, включая географическое положение региона, уровень развития транспортной инфраструктуры, объемы грузопотоков, промышленно-аграрный потенциал, объемы производства и потребления товаров, экспортно-импортный потенциал, численность населения и возможности интеграции в международные транспортные коридоры. Установлено, что применение совокупности указанных критериев позволяет объективно оценить соответствие отдельных территорий требованиям размещения транспортно-логистических центров. Предложенные критерии могут быть использованы в качестве научно-методической основы для выбора оптимальных мест размещения транспортно-логистических центров и развития транспортной инфраструктуры Республики Таджикистан.

Ключевые слова: *транспортно-логистические центры, размещение, критерии размещения, транспортная инфраструктура, грузопотоки, промышленно-аграрный потенциал, логистический потенциал, международные транспортные коридоры, Республика Таджикистан.*

Introduction

In the context of the development of the national economy and its connection with production, transport and logistics centers are considered one of the most important tasks of the leading sector of the state economy. As a result of changes in the international transport system and the development of transport and logistics services, the country's production sectors are growing, and the demand for modern

transport infrastructure is increasing. As a result, there is a need to organize infrastructure in the regions that connects the production process with transport products [1-6]. One of these facilities is transport and logistics centers, which are considered as a node for connecting and guiding the production process to services. It should be noted that the organization of such infrastructure depends on the capabilities and capacities of the regions. Each region differs from other regions in terms of its relief and requires its own type of transport and logistics centers.

Methods

The study employs methods of comparative and systematic analysis, statistical analysis, grouping and classification, as well as an assessment of economic, geographical, transport, and infrastructural factors. The proposed criteria are analyzed in terms of their influence on the selection of optimal locations for transport and logistics centers.

Research objectives:

- ✓ To analyze the geographic, economic, transport, and infrastructural characteristics of the Republic of Tajikistan that influence the placement of transport and logistics centers.
- ✓ To identify the key factors and criteria determining the suitability of territories for the placement of transport and logistics centers.
- ✓ To evaluate the importance of transport accessibility, freight traffic, industrial and agricultural potential, and regional economic activity when selecting the location of transport and logistics centers.
- ✓ To systematize the identified criteria and determine their role in selecting optimal locations for transport and logistics centers.
- ✓ To develop methodological recommendations for the application of the proposed criteria to justify the placement of transport and logistics centers in the regions of the Republic of Tajikistan.

Results

The study identified and systematized the main criteria for the location of transport and logistics centers in the Republic of Tajikistan. These are geographical location, transport accessibility, level of development of transport infrastructure, volume of cargo flows, industrial and agricultural capacity, volume of production and consumption, export-import activity, population size, and opportunities for integration with international transport corridors. The results show that a comprehensive review of these criteria provides a more objective basis for determining the most suitable areas for the location of transport and logistics centers.

It is worth noting that norms as influential tools can determine the possibilities for the formation of TLC in the region. In this case, the issue of the location of transport and logistics centers acquires significant scientific importance, since the appropriate or optimal location of these centers can have a positive impact on increasing the efficiency of transportation and economic development. It is through these centers that the connection of production with consumption, the integration and interaction of transport modes, and the timeliness of the supply chain can be established. The formation of such centers is carried out by determining the main location criteria. Criteria are, first of all, a set of factors that determine the requirements and assessment of the areas for the location of transport and logistics centers. In terms of optimal location, integration of transport modes, and the connection of logistics systems, criteria play a key role and make a significant contribution to the development of production and transport processes. In this regard, based on the analysis of scientific papers and publications, the main criteria for the location of transport and logistics centers have been determined. They are divided into the following groups depending on their characteristics and functions:

Table 1-Criteria for selecting locations for transport and logistics centers (TLC)

№	Criteria content	Criteria	Evaluation indicators
1	Transport accessibility	The level of provision of the territory with roads, railway lines and border crossings	<ul style="list-style-type: none"> - Length of paved roads; - Proximity to international transport corridors; - Availability of transport hubs
2	Intensity of freight traffic	Volumes and directions of cargo movement generated in the region	<ul style="list-style-type: none"> - Freight turnover (thousand tons/year); - Volumes of produced and consumed freight; - Share of transit traffic

Continuation of Table 1

3	Industrial and agricultural potential of the region	The level of development of industry and agriculture as sources of cargo generation	<ul style="list-style-type: none"> - Number of enterprises; - Volume of industrial and agricultural output; - Region's share of gross output
4	Infrastructure provision	Availability of logistics and warehouse infrastructure suitable for servicing the TLC	<ul style="list-style-type: none"> - Warehouse space; - Availability of refrigeration and terminal facilities; - Multimodal transportation capabilities
5	Territorial and geographical position	The strategic position of the territory in relation to national and international markets	<ul style="list-style-type: none"> - Distance to borders and major cities; - Location at the intersection of transport corridors; - Geographic advantages
6	Availability of land resources	Possibility of allocating a land plot for the construction of a transport and logistics center	<ul style="list-style-type: none"> - Land cost; - Area of available land; - Site readiness
7	Economic efficiency of placement	Financial feasibility of construction and operation of the TLC	<ul style="list-style-type: none"> - Reduced logistics costs; - Reduced delivery time; - Reduced project payback period
8	Investment potential	Opportunities to attract investment and availability of support mechanisms	<ul style="list-style-type: none"> - Availability of free economic zones; - Public-private partnership (PPP) opportunities; - Tax and financial incentives
9	Socioeconomic impact	Potential impact of the TLC on regional development	<ul style="list-style-type: none"> - Number of jobs created; - Growth in regional GRP; - Improved accessibility to commodity markets
10	Environmental sustainability	Compliance with environmental requirements and reduction of negative impacts	<ul style="list-style-type: none"> - Emissions level; - Potential for implementing "green technologies"; - Environmental assessment of the site

The Republic of Tajikistan is a mountainous region with a rugged terrain and limited access to sea transport. It is this limitation that leads to increased transport costs, imperfect services and a decrease in the efficiency of transportation. In this case, in order to connect the production market with consumers, reduce the number of participants in the logistics chain and integrate transport infrastructure services, the transport accessibility criterion is key and will lead to a solution to this problem. Transport accessibility is assessed based on the following factors: order execution time; availability of transport modes in the region; existing infrastructure; cargo volume, etc. It should be noted that the specified criterion reduces freight transportation costs and increases the speed of cargo turnover, and this is one of the key criteria in the process of determining the location of transport and logistics centers [2-4]. In conclusion, it should be noted that the role of this criterion is to connect transport and logistics facilities to production centers and plays an important role in increasing the efficiency of transport operations. The main indicators of the specified criterion are the presence of roads, proximity to international corridors and the presence of transport hubs. The Republic of Tajikistan is located at the junction of international highways and has access to international corridors. The following transit corridors pass through the Republic of Tajikistan within the framework of international programs, connecting the country with other countries of the near and far abroad and providing access to all types of transport for Tajikistan.

Table 2-International Transport Corridors and Their Routes within the Territory of the Republic of Tajikistan

International programs	Name of transit corridor	Route within the territory of the Republic of Tajikistan	Distance (km)
Central Asia Regional Economic Cooperation (CAREC)	CAREC-2	It enters the Republic of Uzbekistan through the Spitamen checkpoint (Spitamen village), passes through the Khujand - Gafurov - Konibodom route, and exits into the Kyrgyz Republic through the Gulistan checkpoint (Isfara village).	143

	CAREC-3	It enters the Republic of Kyrgyzstan through the Karamik checkpoint (Lakhsh town), passes through the Lakhsh - Vahdat - Dushanbe - Tursunzoda route, and exits through the Dusti checkpoint (Tursunzoda town) into the Republic of Uzbekistan.	453
	CAREC-5	It enters the Islamic Republic of Afghanistan through the Panji Poyon checkpoint (Jeyhun), passes through the Jeyhun - Bactria - Dushanbe - Vahdat - Lakhsh route, and exits through the Karamik checkpoint (Lakhsh) into the Kyrgyz Republic.	513
	CAREC-6	It enters the Republic of Uzbekistan through the Bekabad checkpoint, passes through the Khujand - Dushanbe - Bokhtar - Panji Poyon route, and exits through the Panji Poyon checkpoint (Jayhun) into the Islamic Republic of Afghanistan.	402
TPACEKA	–	Termez (border with the Republic of Uzbekistan) – Tursunzoda – Dushanbe – Vahdat – Lakhsh – Karamik (border with the Republic of Kyrgyzstan)	402
	–	Termez (border of the Republic of Uzbekistan) – Tursunzoda – Dushanbe – Vahdat – Kulob – Kalaikhumb – Khorog – Kulma (border of the People's Republic of China)	1075
(Asian Highway Network — AH)	AH-7	Khatlon (border of the Republic of Uzbekistan) – Khujand – Dushanbe – Bactria – Panji Poyon (border of the Islamic Republic of Afghanistan)	512
	AH-65	Karamik (Kyrgyz border) – Dushanbe – Tursunzoda (Uzbek border)	402
	AH-66	Karasu (border with the People's Republic of China) – Kulma – Khorog – Kulob – Vahdat – Dushanbe – Tursunzoda – Dusti (border with the Republic of Uzbekistan)	1075
European Agreement on Main International Traffic Arteries (AGR)	–	Termez (border with the Republic of Uzbekistan) – Dushanbe – Vahdat – Lakhsh – Karamik (border with the Republic of Kyrgyzstan)	402

Discussion

As we have noted, due to the relief of the Republic of Tajikistan, which is more than 93% mountainous, transportation is carried out mainly by road. More than 90% of transportation is carried out by this type of transport, and access to the entire region is provided by road transport [3-5]. Therefore, the volume of transportation is another criterion for determining the location of transport and logistics centers. The current state of this indicator by type of transport in the Republic of Tajikistan has a tendency to increase and over the past five years has been as follows:

Table 3 – Volume of Freight Transportation by Mode of Transport

Years	Total volume of freight transportation by all modes of transport	Including:	Road transport	Rail transport	Air transport
2018	89,607.2		84,257.6	5,348.1	1.5
2019	85,394.6		79,594.7	5,798.8	1.1
2020	85,381.9		79,075.8	6,305.3	0.7
2021	94,611.8		88,900.9	5,709.9	0.9
2022	113,941.4		107,836.3	6,104.2	0.8
2023	120,576.1		114,124.1	6,451.0	0.8
2024	127,693.8		6,712.9	6,712.9	1.4

As can be seen from the table below, the majority of freight traffic in the Republic of Tajikistan is similar to road transport and depends on a number of important factors, including: accessibility to this type of transport, timely preparation; high speed over short distances, easy adaptation to the current situation, etc [7-10].

Each region of the Republic of Tajikistan is different from each other with its own characteristics, and the development of industries in these regions is different. In this regard, another important criterion for the location of transport and logistics centers is the development of regional industries, including industrial, agricultural, construction, trade and transport services. This criterion determines not only the location region, but also the type of transport and logistics centers. The state of development of the listed industries in the regions of the Republic of Tajikistan varies greatly. Depending on the relief and location, the agricultural and industrial sectors are concentrated in the Khatlon region. A large part of the capital's consumer market is provided by agricultural products from this region. The development of the industrial sector is similar to that in the Sughd region and the city of Dushanbe, but is less noticeable in the districts subordinate to the center.

One of the important means of ensuring timely delivery in the supply chain and as a logistics principle is delivery according to the “Just in time” system. The appropriate location of transport and logistics centers connects production with consumption, reduces additional costs and ensures timely delivery, which is another criterion for the location of transport and logistics centers, which is called proximity to consumer markets. Through this criterion, not only timely delivery of goods is ensured, but also the efficiency of transport operations is improved and the quality of service is improved.

Another criterion that is important for the location of transport and logistics centers is the level of development of the industrial and agricultural potential of the region. The Republic of Tajikistan is a mountainous country, and the industrial and agricultural sectors in the regions of the republic are developed differently depending on the natural and climatic features, production resources, availability of raw materials and the level of development of transport infrastructure. Therefore, it is necessary to take into account the volume of industrial and agricultural production of the region in order to determine the location of transport and logistics centers. The volume and structure of industrial production of an administrative region largely depend on its economic potential, expressed as GVA, which forms the nature of transport and logistics flows and determines the demand for transport infrastructure and distribution centers. Industry is a key component of the country's economy, indicating the scale and intensity of production activities in various sectors.

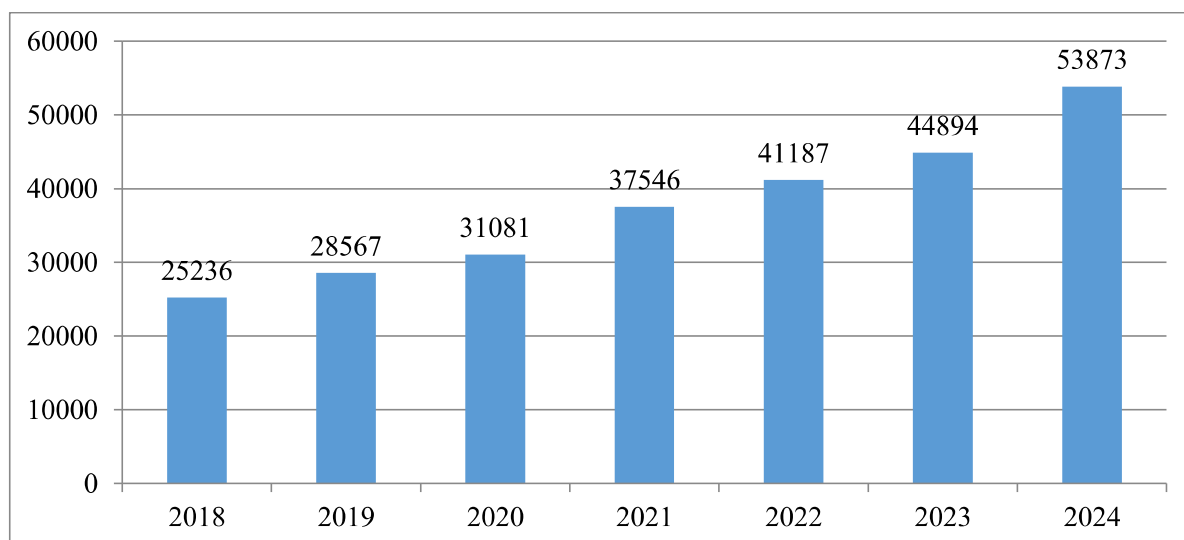


Figure 1 – Product production volume in 2018-2024

An analysis of Tajikistan's industrial production dynamics for 2018–2024 reflects steady growth in economic activity. In 2018, industrial output amounted to 25,236 million somoni, and by 2024, it had grown to 53,873 million somoni, demonstrating growing production potential, requiring transportation and logistics support.

Conclusions

Thus, the standards determine the conditions for the location of transport and logistics centers, through which it is possible to determine the most appropriate ways to choose the location of such centers,

which will ensure the efficiency of their activities, the level of transport and logistics services, and the rational use of the transport and logistics potential of the regions. The specified criteria are of particular importance in the conditions of the Republic of Tajikistan for the formation and placement of transport and logistics centers and provide a methodological basis for determining priority areas for the development of transport and logistics infrastructure.

In areas with large volumes of agricultural production, logistics is the foundation for ensuring economic sustainability, reducing freight transportation costs, and increasing the efficiency of the region's transport and logistics system [4-6].

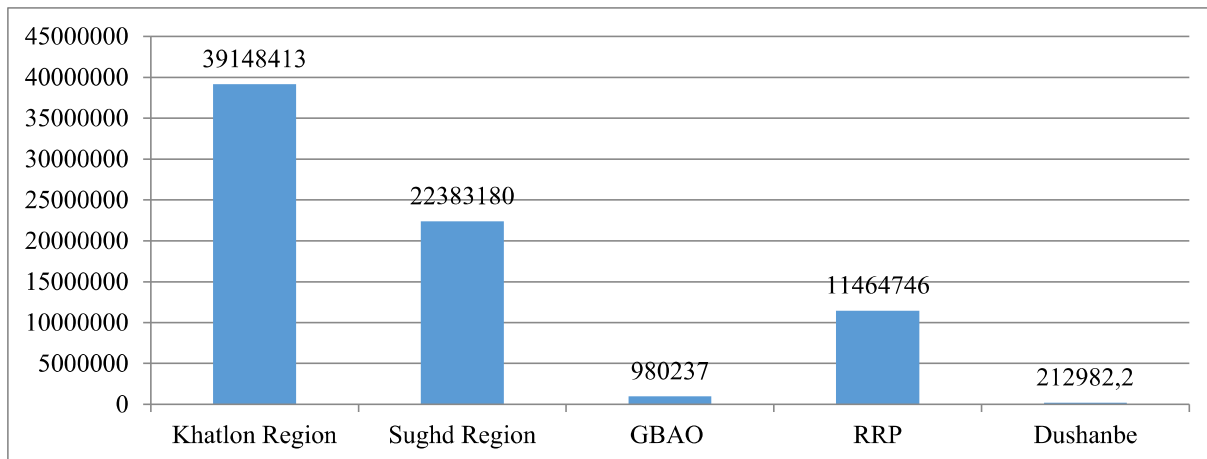


Figure 2 - Volume of agricultural production

The regional share of agricultural production in total agricultural output, an important structural indicator of the agricultural sector, allows one to identify regions that generate the main seasonal and perishable cargo flows. The share is calculated as the ratio of a particular region's output to the country's total output, expressed as a percentage.

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