

DEVELOPMENT OPPORTUNITIES FOR SUSTAINABLE TOURISM LOGISTICS IN THE KARABAKH AND EAST ZANGEZUR ECONOMIC REGIONS OF AZERBAIJAN

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Citation: Isayeva, G. (2026). Development opportunities for sustainable tourism logistics in the Karabakh and East Zangezur economic regions of Azerbaijan. *Geojournal of Tourism and Geosites*, 67(3), 2585–2595. <https://doi.org/10.30892/gtg.67365-1877>

Abstract: In recent decades, sustainable development, environmental protection, and decarbonization have become global priorities, making the transition toward sustainability in the tourism sector a key challenge that shapes the future development of tourism destinations. The development and implementation of tourism products, the design of tourism routes, and the integration of innovative approaches to transport and logistics issues along these routes are essential components. This study explores the potential for implementing sustainable tourism logistics in the Karabakh and East Zangezur economic regions of Azerbaijan. The main objective is to assess how green logistics solutions can support post-2020 reconstruction, reduce carbon emissions, and ensure sustainable tourism development aligned with national climate commitments. An exploratory mixed-methods approach was applied, combining literature review, field observations, and a questionnaire survey among tourists. The study evaluated ecological load, transport chains, tourism facilities, accessibility, seasonality, and tourists' awareness of green practices. Findings indicate strong prospects for sustainable tourism logistics due to newly rebuilt transport infrastructure, smart settlement initiatives, and high tourist interest. However, increased demand raises environmental management challenges. The adoption of low-carbon supply chains, green transport routes, and alternative energy solutions can minimize ecological risks, strengthen sustainable behaviours, and contribute to Azerbaijan's long-term green development agenda. Additionally, fostering collaboration between public authorities, private stakeholders, and local communities will be crucial to ensure the effective implementation and long-term success of sustainable tourism logistics in these regions.

Keywords: tourism, Karabakh, East Zangezur, sustainable tourism logistics, green tourism

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INTRODUCTION

In recent years, the global agenda on sustainable development, environmental protection, and climate change mitigation has increased the importance of transitioning toward sustainability in all sectors of the economy, including tourism. Sustainable tourism development requires an integrated approach that considers economic, social, and environmental dimensions while ensuring long-term resilience and competitiveness of tourism destinations. Numerous researchers have emphasized the strategic relevance of sustainable tourism and tourism logistics for regional development, particularly in post-conflict territories where reconstruction and territorial rehabilitation create new planning challenges (Budeanu et al., 2016).

Following the restoration of Azerbaijan's control over the Karabakh and East Zangezur economic regions in 2020, large-scale reconstruction processes were initiated with the aim of re-establishing socio-economic activity, rebuilding critical infrastructure, and enabling the return of internally displaced persons. These efforts align with national priorities related to climate change mitigation and the Sustainable Development Goals (United Nations, 2015; United Nations in Azerbaijan, 2016). Within this broader context, tourism has been identified as a key sector for the future development of these regions, given their historical cultural value, natural landscapes, and potential to attract domestic and international visitors.

Existing scholarship on sustainable tourism highlights the importance of incorporating environmental considerations, local community interests, and resource-efficient development models into tourism planning (Lagodienko et al., 2022). Researchers have also emphasized that environmentally responsible transport systems, energy-efficient infrastructure, and sustainable logistics solutions play a critical role in shaping modern tourism destinations.

Contemporary approaches increasingly stress the necessity of integrating sustainability principles into road network planning, tourism route design, accommodation services, and regional mobility systems.

Although these studies offer valuable insights into the conceptual and operational foundations of sustainable tourism, there remains a significant research gap concerning the application of sustainable tourism logistics in newly reconstructed or post-conflict regions, particularly in the context of large-scale redevelopment initiatives. In the case of Karabakh and East Zangezur, the almost complete destruction of pre-existing infrastructure, settlements, and transport systems during the

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period of conflict makes the integration of sustainability principles into reconstruction especially relevant. The emerging “smart village” and “green energy zone” models currently being implemented in these territories further reinforce the importance of sustainable logistics strategies for supporting long-term tourism development (Guliyeva & Museyibov, 2022).

Given the renewed interest in the tourism potential of Karabakh and East Zangezur, a strategic approach to the green transition—encompassing sustainable mobility, eco-friendly logistics solutions, and environmentally responsible tourism products—is essential for the successful revitalization of the region. Sustainable tourism logistics can serve as a core component in facilitating visitor mobility, reducing environmental pressure, improving transport efficiency, and supporting climate-resilient destination planning. The aim of this study is to explore the potential for implementing sustainable tourism logistics in the Karabakh and East Zangezur economic regions. It also seeks to identify strategic and sustainable solutions that can support tourism development in the post-conflict reconstruction context.

LITERATURE REVIEW

Sustainable tourism logistics is increasingly recognized as a crucial factor for enhancing the competitiveness and sustainability of tourism destinations. Lanfant et al. (1995) define tourism logistics as the strategic planning and execution of transporting tourists and their goods from origin to destination, ensuring efficiency and seamless travel experiences. Tairova et al. (2019) emphasizes that tourism logistics includes planning, controlling, and coordinating resources to facilitate the flow of people, goods, services, and information within the tourism sector. Study Smarter (2025) further highlights that tourism logistics ensures the necessary infrastructure, transportation, and support mechanisms are in place to offer a smooth and enjoyable travel experience. Bowersox & Closs (1996) note that logistics in tourism should be understood in terms of physical and information flow, emphasizing cost reduction, safety, and convenience through coordination and collaboration. Butler (1980) and Theppitak (2018) also support this perspective, linking logistics to accommodations, transportation, and the overall flow of tourists. Conlin & Baum (1995) demonstrate a direct relationship between the adoption of logistics management in the tourism industry and the success of sustainable tourism development. Theppitak (2018) argues that logistics management facilitates planning for hotels, accommodations, and transport networks, enhancing eco-tourism and tourist satisfaction. Resource Orchestration Theory (ROT) has been applied in tourism contexts to understand how strategic resource bundling and coordination create competitive advantages.

Peuscher (2016), Erbaş (2019) Milwood & Roehl (2018) further explain that ROT supports collaborative innovation networks, trust-building, knowledge mobility, and infrastructure development in tourism destinations. Coordination Theory, as discussed by Messori & Volo (2025), emphasizes the interdependence of tasks among tourism firms, requiring alignment of processes and stakeholder collaboration. Figini (2022) illustrates that effective coordination between destination management and tour operators improves local development outcomes, while Marques (2016) highlights the importance of balancing transport and tourism capacities to optimize infrastructure costs and efficiency. Chen (2014) emphasizes the role of coordination at a regional level, integrating supply, demand, and support subsystems to improve overall tourism logistics performance. Aksu (2025) notes that sustainable tourism logistics incorporates environmental, economic, and social dimensions. Environmentally, logistics strategies aim to reduce carbon emissions, optimize energy efficiency, and promote biodiversity conservation. Economically, they encourage long-term growth through eco-friendly business models, while socially, they engage local communities and preserve cultural heritage.

Rutaba & John (2026) argue that transportation infrastructure, when effectively optimized through logistics, enhances tourist accessibility and flow. Ivasyshyna (2024) further highlights the role of digitalization and smart transport systems in improving logistics efficiency. Akhinson et al. (2025) point out gaps in current research, including limited empirical evidence, neglect of local contexts, insufficient stakeholder perspectives, and challenges in implementing innovative technologies. Theppitak (2018) and Conlin & Baum (1995) emphasize that in special economic zones, economic, political, and technological factors significantly influence the effectiveness of tourism logistics planning.

Finally, innovations such as low-emission transport, bicycle pathways, energy and water recovery systems, composting, and food waste-to-biogas solutions are highlighted by Aksu (2025) as key strategies to enhance environmental sustainability, economic benefits, and social engagement in tourism. These approaches provide significant opportunities for the development of sustainable tourism logistics in the Karabakh and East Zangezur economic regions.

Recent research in *GeoJournal of Tourism and Geosites* confirms that transport accessibility is a basic condition for regional tourism development (Omirezakova & Wendt, 2025), while digital technologies can strengthen sustainable tourism marketing and planning in Azerbaijan (Hajiyeva et al., 2026).

METHODOLOGY

The study investigated the potential for implementing sustainable tourism logistics in the Karabakh and East Zangezur economic regions of Azerbaijan. Due to the exploratory nature of the research, a mixed-methods approach was deemed most appropriate, combining literature review, field observation, surveys, and analysis of transport and tourism infrastructure data. Firstly, a review of scientific sources and international best practices in sustainable tourism logistics was conducted to establish a theoretical framework. Secondly, the ecological load of existing tourism attractions, including environmental impacts of transport chains and tourism facilities, was assessed through field observations and site visits.

To gather primary data, a questionnaire survey was carried out among tourists visiting or planning to visit the Karabakh and East Zangezur regions. The survey included questions on tourists' demographic characteristics (age, gender, occupation, country of origin), travel preferences, and awareness and willingness to adopt “green” practices during their trips. Additionally, the study examined the existing composition of tourism products, including seasonality, distances from

major transport hubs and cities (Baku, Ganja), and the accessibility of tourist facilities. Opportunities and risks associated with applying sustainable logistics solutions, such as green transport routes and alternative energy sources, were also evaluated. The methodological sequence applied in this study is summarized in Figure 1.

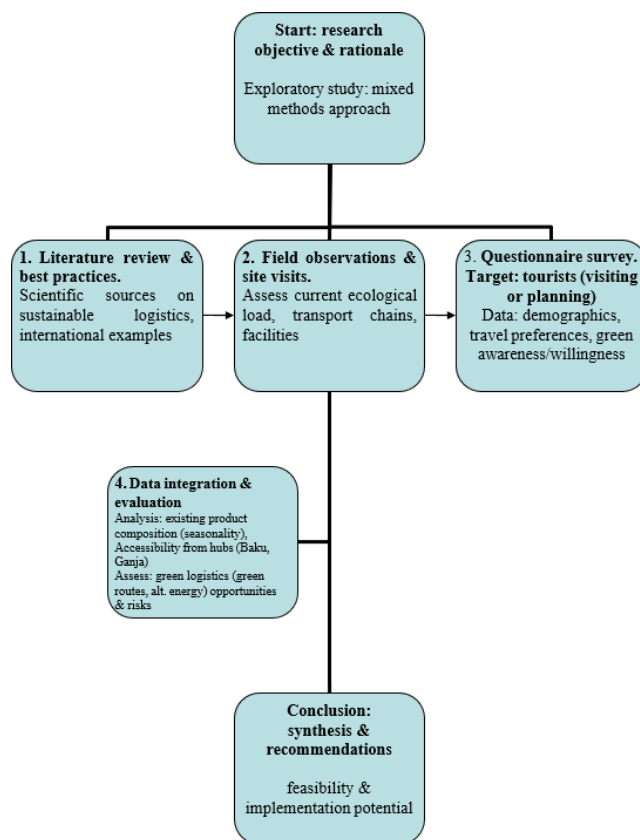


Figure 1. Research methodology flowchart (Source: Prepared by the author)

RESULTS AND DISCUSSIONS

Logistics has evolved into a strategic planning and management tool aimed at achieving synergy during the flow of goods and services from producers to end consumers within a competitive global market. Modern logistics can be analyzed through three primary lenses: managerial, economic, and financial perspectives (Imanov, 2005).

From these perspectives, key objectives include the integration of logistics processes, strategic coordination, meticulous planning, and operational control. Such approaches enhance system flexibility and enable the continuous refinement of logistics practices within the framework of a defined market strategy. At the regional level, logistics assumes a more localized, dynamic, and adaptive role (Maharramov, 2021). The primary tasks here include minimizing product storage time to facilitate faster delivery at tourism service points, reducing transportation time, optimizing vehicle allocation, responding swiftly to consumer demands, and ensuring effective processing and transmission of information. These tasks are central to the functional scope of logistics, encompassing the formation and regulation of economic relations for goods and service provision, rationalization of resource distribution, and determination of material flow volumes and directions. Importantly, regional logistics operations must also address environmental sustainability, climate change mitigation, and the transition toward a green economy (Doğan, 2020). One of the most significant contemporary applications of logistics is in the tourism sector. The role of logistics in tourism is determined by the geographic distribution of tourism resources, the characteristics of tourism products, and the accessibility of these products to consumers (Yankovenko, 2014).

Consequently, the development and growth of tourism in any region are closely tied to the attractiveness of available resources, the quality of socio-cultural and tourism infrastructure, and the strategic utilization of tourism routes. In practice, tourism logistics focuses on optimizing the interaction between tourist movement, accommodation facilities, and food service points. This involves planning, controlling, and managing operations within the tourist region, ensuring that the final tourism product reaches consumers efficiently while satisfying their preferences and requirements. Moreover, tourism logistics encompasses the transfer, storage, and processing of relevant information, as well as minimizing costs for tourists during travel from their origin to temporary destinations. It also involves optimizing the distribution of tourism products from sellers, such as tour operators or travel agents, to end consumers (Edirisinghe et al., 2021).

The relationships among the principal tourism-logistics actors are presented in Figure 2. In essence, tourism logistics functions as a service-oriented system in which multiple stakeholders—suppliers of tourism components, transport enterprises, tour operators, agents, and tourists—actively participate in decision-making processes. Effective tourism logistics ensures not only the operational efficiency of the tourism system but also enhances the overall consumer experience, thereby serving as a critical enabler for sustainable tourism development.

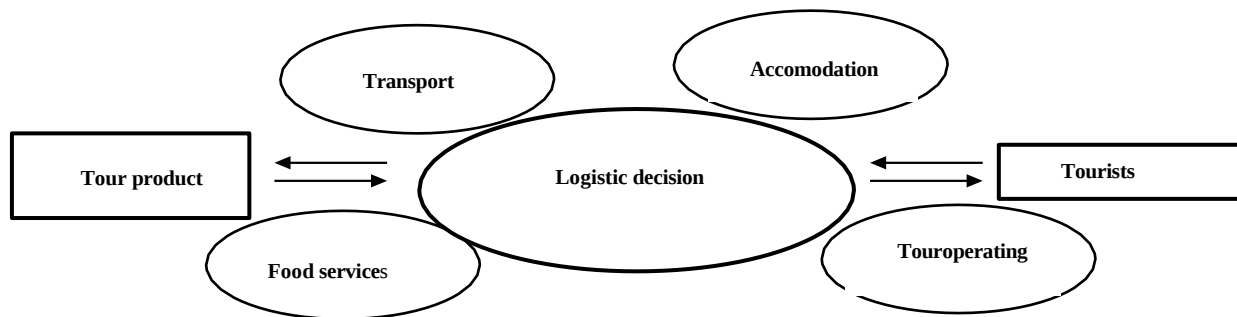


Figure 2. Tourism logistics framework (Source: Prepared by the author based on Zhang et al., 2009)

This can be described as follows: As can be seen, tourism logistics is a necessary component for the tourism industry to function as a complete system. The need to apply sustainable logistics in tourism is explained by the close connection of this area with the state policy implemented in general socio-economic and regional development, the active movement of tourists, the diversity of tourism services, and the international relations existing here.

In particular, the geographical location of the tourism region, the electric vehicles used by tourists during their travels here from various directions, as well as the use of walking and cycling opportunities, increase the importance of “sustainable logistics” in this area. On the other hand, in the context of modern industrial development, depletion of raw materials and traditional energy sources, minimizing environmental damage, and reducing waste during tourism travel are also becoming more relevant, which is explained by the fact that tourism creates an integrative relationship with many areas. All of these are issues that increase the importance of applying green logistics when organizing tourism travel.

Currently, “sustainable tourism logistics” (Akhirson et al., 2025) refers to the organization of tourism trips with sustainable use of tourism resources, less environmental impact, and low-carbon and zero-waste tours. When looking at research on sustainable tourism logistics, it is considered not only to reduce emissions during tourism trips, but also to improve the sustainable management of the destination through smart transportation, waste reduction, and energy efficiency (Budeanu, 2007). As can be seen, the highest goals set by the state in the field of tourism are taken as a basis here. Thus, the ultimate goal of planning in tourism is based on the sustainable development of the destination. According to another author (Hunter, 2002), sustainable tourism logistics is an important component of sustainable tourism development, especially in ecologically sensitive regions. Summarizing these, the activities of the elements during “sustainable tourism logistics” as a component of tourism logistics are summarized in Figure 3.

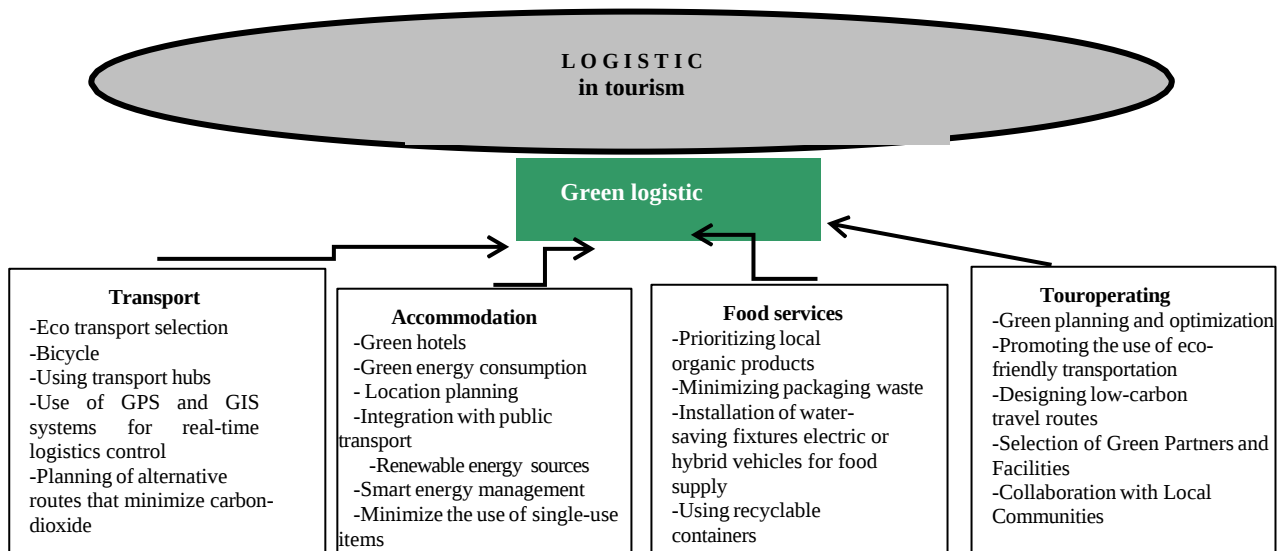


Figure 3. Sustainable tourism logistics components
(Source: Prepared by the author based on Christopher, 2016, and adapted to the sustainable tourism logistics context)

The application of tourism logistics and especially green tourism in Karabakh and East Zangezur can be explained by the current situation of these regions and the future development prospects of tourism here. Following the liberation of regions previously affected by long-term conflict, where both the economic and ecological conditions were severely impacted and tourism resources were degraded, the development of tourism has become a key priority for regional reconstruction in Azerbaijan. The return of displaced populations to these areas highlights the need for ecological restoration and sustainable development measures. As of July 2025, internally displaced persons have been successfully resettled in six cities and villages across these regions, with over 50,000 individuals now living, working, and studying locally (President of the Republic of Azerbaijan, 2025). The areas currently exhibit minimal industrial and agricultural waste; however, decades of occupation led to significant environmental degradation, including deforestation, disruption of irrigation systems, and soil erosion

(Nesirova, 2022). These conditions indicate that the implementation of sustainable tourism logistics could play a crucial role in mitigating the ecological footprint of tourism activities, promoting sustainable tourism development, and supporting the restoration of local ecosystems. Karabakh and East Zangezur economic regions: overview

The Karabakh and East Zangezur economic regions are located in the southwest of Azerbaijan, sharing borders with the Islamic Republic of Iran and the Republic of Armenia. These regions were formally established by the Decree of the President of the Republic of Azerbaijan on July 7, 2021. According to this decree, the East Zangezur economic region—encompassing the liberated Zangilan, Gubadli, Jabrayil, Lachin, and Kalbajar districts—and the Karabakh economic region—which includes Agdam, Shusha, Fuzuli, Tartar, Khojavand, Khojaly districts, the city of Khankendi, as well as Agjabedi and Barda districts—were created to ensure the restoration and sustainable development of the Karabakh economic region (President of the Republic of Azerbaijan, 2022; Figure 4).

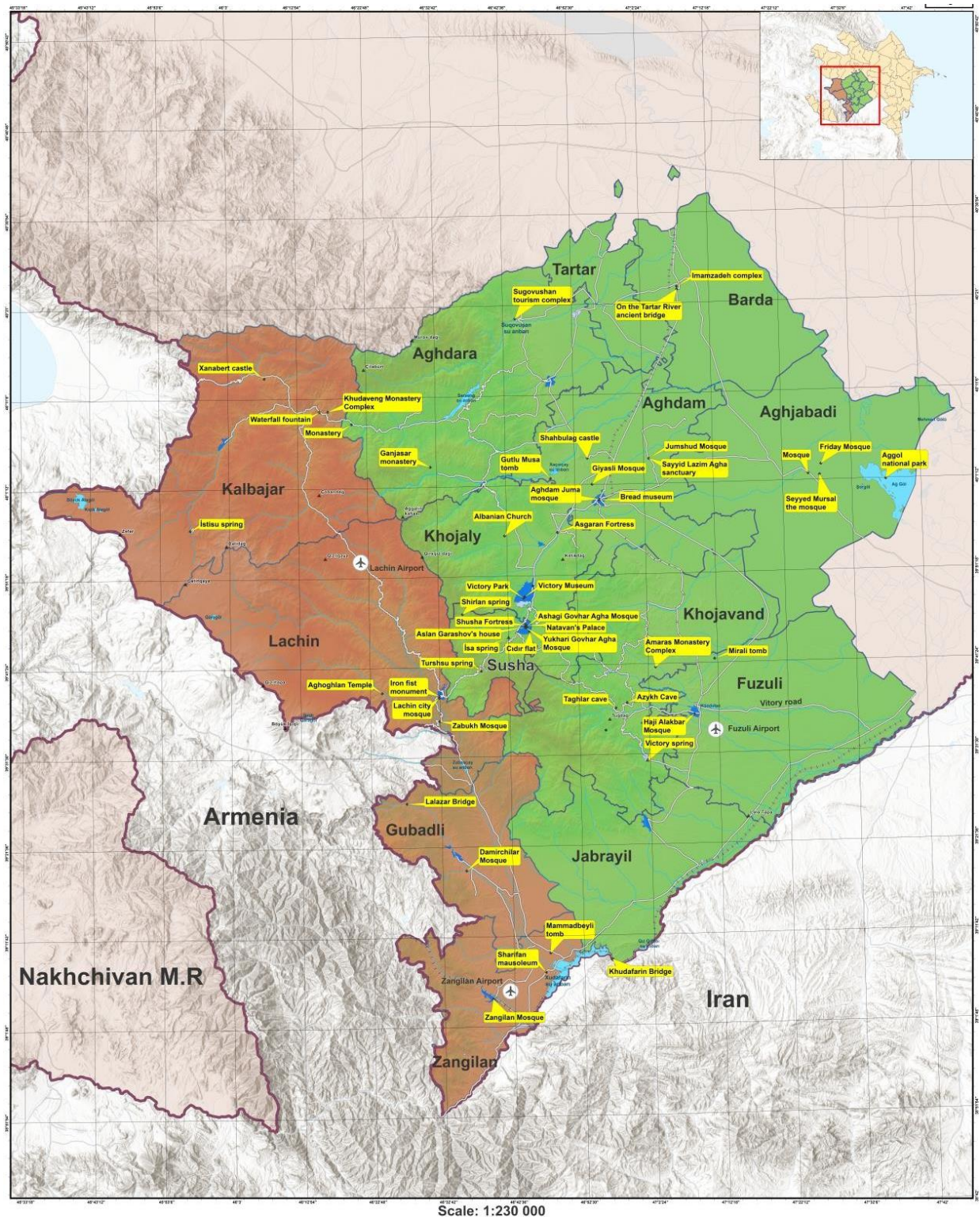


Figure 4. Map of East Zangezur and Karabakh economic regions (Source: The map was prepared by the author)

The establishment of these new economic regions aims to implement comprehensive measures for the rehabilitation of territories liberated from occupation, facilitate their long-term development, develop essential infrastructure, support the return of residents to their former homes, and promote balanced regional growth. This initiative leverages the rich economic potential, natural resources, and extensive tourism opportunities of these regions. In addition to abundant natural resources and a favorable geostrategic position, the Karabakh and East Zangezur economic regions are historically notable for their natural and cultural tourism resources, which had been prominent even prior to the occupation. During the Soviet era, a wide-ranging tourism and recreational infrastructure was established in the area. However, political conflicts since 1988 have caused substantial impacts on the tourism sector, as well as other economic activities, in both regions.

The total area of the Karabakh and East Zangezur economic regions is approximately 8.99 thousand km² and 7.47 thousand km², respectively, with a network of highways extending over 900 kilometers. Although modern railways are currently underutilized for tourism, the newly developed railway infrastructure offers opportunities for the application of sustainable tourism logistics and the transition to a sustainable economy. In particular, the Horadiz–Aghband railway line is expected to play a key role in regional integration via the Zangezur corridor and could support low-carbon tourist transportation. Another line is planned to connect Barda–Agdam–Khankendi. Existing airports in these regions, including the Fuzuli, Zangilan, and Lachin international airports and Khojaly Airport, are already accessible to tourists. The routes currently actively used by tourists in the region are presented in Table 1 (Our Road to Karabakh, 2026; Raimbekov et al., 2018).

Table 1. Road routes and their lengths in the Karabakh economic region

(Source: The table was prepared by the author based on the official data of the State Agency of Azerbaijan Automobile Roads)

№	The name of the road	Length (km)
1	Talysh – Tapgaragoyunlu – Gashalti Road	22.0 km
2	Gubadlı – Eyvazlı Road	28.0 km
3	Tartar – Sugovushan – Talysh Road	28.5 km
4	Istisu – Kalbajar Road	31.5 km
5	Shukurbayli – Jabrayil – Hadrut Road	42.0 km
6	Fuzuli – Hadrut Road	55.0 km
7	Gubadlı – Lachin Road	66.0 km
8	Kalbajar – Lachin road	72.8 km
9	Toganali – Kalbajar – Istisu (general route)	~80.7 km
10	Toganali – Kalbajar Road	80.7 km
11	Fuzuli – Shusha Road	81.6 km
12	Zafar Road	101.0 km
13	Horadiz – Aghband Road	110.4 km
14	Barda – Agdam – Minjivan – Aghband Road	123.6 km
15	Barda – Agdam – Khankendi Road	124.7 km

Table 2. Cultural and green tourism potential in Karabakh economic region (Source: Prepared by the author)

№	Name of tourism resources	Location (district)	Type
1.	Khankendi Kurgans	Khankendi	Cultural tourism resources
2.	Aggol National Park	Agjabadi	Eco-tourism resources
3.	Aghdam Juma Mosque	Aghdam	Cultural tourism resources
4.	Shahbulag Castle	Aghdam	Cultural tourism resources
5.	Palace of Panahali Khan and the Imarat complex	Aghdam	Cultural tourism resources
6.	Aghdam Bread Museum	Aghdam	Cultural tourism resources
7.	Gutlu Musa Tomb	Aghdam	Cultural tourism resources
8.	Uzarliktepe settlement	Aghdam	Cultural tourism resources
9.	Barda Imamzadeh Complex	Barda	Cultural tourism resources
10.	Sheikh Babi's Tomb	Fuzuli	Cultural tourism resources
11.	Shah Abbas Caravanserai	Fuzuli	Cultural tourism resources
12.	Mirali Tomb	Fuzuli	Cultural tourism resources
13.	Asgaran Castle	Khojaly	Cultural tourism resources
14.	Azykh Cave	Khojavand	Cultural tourism resources
15.	Amaras Monastery	Khojavand	Cultural tourism resources
16.	Taghlar Cave	Khojavand	Cultural tourism resources
17.	Ancient bridge over the Tartar River	Tartar	Cultural tourism resources
18.	Sugovushan Tourism Complex	Tartar	Cultural tourism resources
19.	Khudaferin bridges	Jabrayil	Cultural tourism resources
20.	Khudaveng Monastery Complex	Kelbajar	Cultural tourism resources
21.	Lalazar Bridge	Gubadli	Cultural tourism resources
22.	Damirchilar Mosque	Gubadli	Cultural tourism resources
23.	Aghoghlan Monastery	Lachin	Cultural tourism resources

The Karabakh and East Zangezur economic regions of Azerbaijan are endowed with abundant tourism resources. During the Soviet era, these regions—second only to Baku in terms of tourist visits (excluding areas bordering the capitalist

state of Iran)—were recognized for their rich historical, cultural, and natural attractions. Notably, the city of Shusha, designated as the cultural capital of Azerbaijan, holds particular significance. As a symbol of Azerbaijan's victory in the 44-day Second Karabakh War, Shusha has experienced a marked increase in tourist numbers since 2020. Since 2020, thousands of tourists have traveled on regular bus flights organized by the Azerbaijan Land Transport Agency (ALTA) to the liberated territories. Currently, the main direction of movement of tourists in the Karabakh economic region is Fizuli-Khojavand-Shusha-Khankendi-Aghdam. In the East Zangezur economic region, the main tourism resources are located in the direction of Jabrayil-Gubadli- Lachin. The alternating location of historical-cultural and natural tourism resources in both regions and the landscape structure of these areas are also factors affecting tourism logistics here. Official restoration initiatives are also reshaping access to major heritage sites (Karabakh Revival Fund, 2026).

The tourism resources available in Karabakh and East Zangezur are presented in Tables 2 and 3.

Table 3. Tourism attractions and heritage sites in Shusha city (Source: prepared by the author)

No	Object name	Tourism resources
1.	The Upper Govhar Agha Mosque	Cultural tourism resources
2.	The Lower Govhar Agha Mosque	Cultural tourism resources
3.	Natavan's Palace	Cultural tourism resources
4.	The Karabakh Khan's Palace	Cultural tourism resources
5.	Molla Panah Vagif's Mausoleum	Cultural tourism resources
6.	Shusha Cave Camp	Cultural tourism resources
7.	Shusha Fortress	Cultural tourism resources
8.	Uzeyir Hajibeyov's House- Museum	Cultural tourism resources
9.	Bulbul's House- Museum	Cultural tourism resources
10.	Gara Boyuk Khanum Tower	Cultural tourism resources
11.	The Caravanserai of Agha Qahraman, Son of Mir Siyab	Cultural tourism resources
12.	Two-story Caravanserai	Cultural tourism resources
13.	Kazanchi Church	Cultural tourism resources
14.	İsa Spring	Natural tourism resources
15.	Cıdır Flat	Natural tourism resources
16.	Turshsu	Natural tourism resources
17.	Shirlan	Natural tourism resources
18.	Chatir Waterfall	Natural tourism resources

The implementation of sustainable tourism logistics in Karabakh and East Zangezur is based on the movement of tourists to this area and the use of tourism services through the airports, roads, bridges, tunnels created here. Also, in the form of smart settlements created here, the local population and, in general, all citizens of the Republic of Azerbaijan have the opportunity to get acquainted with new living standards in the form of new types of settlements. When looking at the services that can be provided to tourists in terms of existing tourism resources and transport logistics opportunities in these regions, the problems that arise can be shown as follows. Thus:

- Insufficient existing infrastructure at the initial stage to meet the tourist interest in Karabakh and Eastern Zangezur after its liberation;
- Uneven location of hotels, restaurants and other socio-cultural institutions to manage tourist flows along the existing road and transport network to reach tourist attractions during trips in Karabakh;
- Despite the attractive tourism resources available in the Karabakh economic region, there are restrictions on individual travel here;
- According to tourists' social media impressions, the traces of destruction (former settlements, monuments, infrastructure, landscape, etc.) that still exist around most of the attractions located on their travel routes create negative emotional feelings (Figures 5 and 6); The documented destruction of the Aghdam Bread Museum is one example (ArmenianCrimes, 2026; Ministry of Culture of the Republic of Azerbaijan, 2026).
- The threat of mine explosions remains as a result of the contamination of the territory with mines by Armenia (Mine safety).

Diversification of the routes for tourists to reach Karabakh and East Zangezur, the establishment of roadside stops, and the construction of hotels are among the prerequisites for the development of the tourism industry created in Karabakh and East Zangezur during the post-occupation recovery and return period based on the principles of sustainability. In addition, there is the issue of training personnel who will organize tour operators and excursion services for tourists in the Karabakh and East Zangezur territories. In terms of logistics, the Shusha, Agdam, Kalbajar, Lachin, Khankendi, and Zangilan routes are of primary interest for tourists traveling to Karabakh and East Zangezur. Thus, the integration of the Khojaly Airport, which previously existed in the region, and the Fizuli, Zangilan and Lachin international airports built here after the liberation of the region from occupation, as well as the newly built railway with more than 10 highways here can be considered a convincing argument in terms of green logistics research. Research in this area allows us to draw conclusions about the optimal ratio of carbon dioxide emissions reduction when using air, rail and land routes (Wang et al., 2024; Trevisan & Bordignon, 2020; EUROCONTROL, 2021; Lomachynska & Andrushchenko, 2025).

In order to conclude in this area, it is also possible to consider the socio-economic basis of the application of green logistics in tourism, and green logistics in general, according to another study (Doğan, 2020). Thus, considering that in a

period when tourism demand is increasing, up to 40 percent of the global energy market's oil demand is transported by land, and air transport accounts for up to 3 percent of global warming, it is necessary to take into account the minimization of carbon dioxide emissions caused by tourists during their travels.



Figure 5. Bread Museum destroyed in Aghdam during the occupation period (1992–2020) (Source: The author)



Figure 6. Caravanserai of the Safarov brothers destroyed in Shusha city during the occupation (1992–2020) (Source: The author)

The issues of applying green logistics during tourism activities in Karabakh and East Zangezur can be explained by the state support for this area, planning for transport hubs, hotels, food establishments, tourist camps, and the awareness of travelers about sustainable tourism logistics and their interest in walking and cycling. It should be noted that currently, the declaration of the Karabakh and East Zangezur economic regions of Azerbaijan, along with the Nakhchivan Autonomous Republic, as green energy zones, and the large-scale projects implemented here towards the transition to a green economy indicate state support for this. In these regions, as well as in the Nakhchivan Autonomous Republic, the transition to green energy, the replacement of traditional means of transport with electric vehicles, and the optimization of tourism routes indicate state support for the application of sustainable tourism logistics.

In addition, the government of the Republic of Azerbaijan expresses its support for the development of this sector through international cooperation in the field of joint fight against climate change, the transition to a digital economy in most sectors of the economy, including tourism logistics, and the adoption of an artificial intelligence strategy. The government of the Republic of Azerbaijan pays special attention to these issues in the reconstruction of Karabakh and East Zangezur, demonstrating the priority position of these regions in the transition to a green economy with the smart settlements they have built. In addition, the tunnels being built on the roads leading to Shusha, an important tourism center of Karabakh, also have an impact on green logistics. These priorities are consistent with Azerbaijan's green-economy policy agenda (COP29 Azerbaijan, 2025; Qasimli et al., 2021; Tang et al., 2017).

Planning issues for sustainable tourism logistics include increasing the share of low- carbon transport in the supply chain between tourists and tourism products and selecting optimal routes and stopping points for tourists moving from one attraction to another. According to one study, 24 percent of global carbon dioxide emissions are generated by logistics activities (Doğan, 2020). The fact that tourism ranks 3rd-4th in the global economy (UN Tourism, 2024) suggests that green logistics can make a significant contribution to reducing emissions. These issues also require resolving conflicts arising from the individual behavior of tourists, who want to see more attractions in a given travel period and at the same time spend less money by spending their time rationally.

In many developing countries, including Azerbaijan, tourists often prioritize personal leisure interests over environmental considerations, frequently traveling in hydrocarbon- fueled private vehicles and contributing to pollution and waste generation. However, organizing large group tours with lower carbon footprints—such as bus tours accommodating 18 to 45 passengers, and optimizing routes between key destinations (including hotels, restaurants, and designated rest stops) can result in more environmentally sustainable tourism practices.

Furthermore, government support for the transition to electric vehicles, along with the development of necessary infrastructure (such as electric charging stations) beyond the capital city, particularly in the Karabakh and East Zangezur economic regions, can significantly contribute to achieving these sustainability goals. In addition, prioritizing walking and cycling for individual or family travel could also be more environmentally efficient. This would allow for the regulation of carbon dioxide emissions per tourist with quotas and their alignment with international standards as environmental indicators in the logistics chain applied during tourism activities in the region.

In this context, if we refer to the analysis of the survey results (Isayeva, 2025), conducted to arrive at predictive results on sustainable tourism logistics in the Karabakh and East Zangezur economic regions, we see that the main purpose of the visits to Karabakh of respondents aged 18-25 (89.3 percent) was education (Karabakh University). At this time, it was found that 75 percent of the respondents planned their trips themselves, 46.4 percent preferred a private car, and used taxi

and private car services more often at the place of travel. 39.3 percent of the respondents reported the lack of public transport during their trip to Karabakh, 50 percent reported that logistics problems affected their stay here longer, and 46.2 percent of respondents said that this would be possible with the opening of more public transport routes in terms of how to improve tourism logistics in the region. Then, to the question about the use of environmentally friendly means of transport in Karabakh and East Zangezur, 74.1 percent of respondents answered “no”.

Interestingly, 19.2 percent of those asked about the development of green means of transport in the region chose walking, and 65.4 percent of people gave a positive answer to the question about the impact of environmentally friendly transport on tourism if it were widespread in the region.

84.6 percent of respondents gave a positive answer to the question about the impact of this on tourism travel. When asked about the direction of which tourism routes green transport could be applied more in the region, 46.4 percent of respondents chose the answer “Khankendi”.

Finally, respondents participating in the survey stated that 50 percent of Khankendi, 35.7 percent Shusha, 10.7 percent Lachin, and 3.6 percent Agdam were suitable for the logistics of tourism routes in the region.

Findings

To summarize all this, it can be noted that in order to achieve “green results” during tourism activities, sustainable tourism logistics to be implemented in the Karabakh and East Zangezur economic regions of Azerbaijan can be considered as an important part of the restoration and construction work carried out here after 2020. In order to achieve the target of reducing carbon emissions by 40 percent by 2050 within the framework of the commitments undertaken by the Republic of Azerbaijan in the field of combating climate change, the work to be done in this direction in the tourism sector will also be one of the main priorities. Considering the interest of Karabakh and East Zangezur in both ecotourism and cultural tourism resources, the implementation of operations with less carbon emissions in the supply chain, in terms of realizing the tourism product created here in accordance with the principles of sustainable development will create a need for the application of green logistics. The road and transport infrastructure (airports, roads and railways) created in these regions over the 5 years after 2020, relevant service facilities for overnight stays and meals for tourists, and the work carried out to create “smart settlements” in the region also reveal the prospects for the application of sustainable tourism logistics.

Although it is thought that “sustainable tourism logistics” will be applied later in the realization of the tourism potential of Karabakh and East Zangezur than traditional logistics, it is possible to predict that this will be a common context in terms of future goals for the state, private sector, local community and tourist interests.

The tourism activity created in Karabakh and East Zangezur will be an integral part of the tourism policy implemented in the Republic of Azerbaijan in general, and will lead to more positive results with the application of the completely rebuilt infrastructure and previously existing management experience.

Since the Karabakh and East Zangezur economic regions have been under occupation for 30 years and are inaccessible to citizens of the Republic of Azerbaijan, the tourist interest here is greater than in other parts of Azerbaijan, which creates corresponding problems in the management of tourism in the area, which makes the issues of environmental protection even more relevant. In this sense, “sustainable tourism logistics” on tourism routes in these two regions can be useful in minimizing environmental risks. Management models for “sustainable tourism logistics” to be applied in highly prestigious tourism regions such as the Karabakh and East Zangezur economic regions of the Republic of Azerbaijan can also strengthen the population’s inclination towards hiking, cycling and group tours in the future by shaping “green behaviors” in tourists traveling there. The results achieved in the Karabakh and East Zangezur economic regions on “sustainable tourism logistics” are important in terms of prestige, in addition to their economic and social benefits, which, as a developing country, can take an important place in the “green agenda” of the Republic of Azerbaijan and allow the application of the experience gained in other parts of the country.

CONCLUSIONS

This study demonstrates that sustainable tourism logistics is a key component for the restoration, development, and future growth of the Karabakh and East Zangezur economic regions. The implementation of green logistics in these areas is closely linked to post- occupation reconstruction, socio-economic revitalization, and environmental sustainability. Investments in airports, railways, highways, tunnels, and smart settlements provide the foundation for low-carbon and efficient tourism logistics. Integration of air, rail, and road transport helps reduce CO₂ emissions while improving accessibility to cultural and natural tourism resources. Sustainable tourism logistics reduces carbon emissions, promotes eco-friendly transport, encourages responsible tourist behavior, supports resettlement of displaced populations, revitalizes local economies, and enhances tourist experiences. Survey results indicate growing interest in environmentally friendly transport and walking/cycling options, suggesting that promoting group-based, low-carbon tourism can strengthen green logistics outcomes. Government support through green energy zones, smart infrastructure planning, and integration of digital/AI tools reflects a strategic commitment to sustainable tourism logistics and provides a replicable model for other regions. Overall, applying sustainable tourism logistics in Karabakh and East Zangezur represents a unique opportunity to combine ecological, social, and economic objectives, transforming post-conflict regions into sustainable tourism hubs with minimized environmental impact.

This study has several limitations. Data primarily covers the post-liberation period (2020–2026); long- term trends in tourist behavior, infrastructure use, and environmental impact may evolve differently. The survey focused on young tourists (18–25 years) and education- related travel, which may not fully represent broader tourist demographics. While significant

progress has been made, some tourism infrastructure is still under development, and certain routes or services may not yet reflect long-term conditions. CO₂ emissions and ecological impacts are based on transport modes and routes; future empirical data will be needed to validate these estimates. Addressing these limitations in future research will enable a more comprehensive assessment of sustainable tourism logistics and its long-term environmental, social, and economic impacts in Karabakh, East Zangezur, and other post-conflict regions.

Author Contributions: Conceptualization, G.I.; methodology, G.I.; software, G.I.; validation, G.I.; formal analysis, G.I.; investigation, G.I.; data curation, G.I.; writing - original draft preparation, G.I.; writing - review and editing, G.I.; visualization, G.I.; supervision, G.I.; project administration, G.I. The author has read and agreed to the published version of the manuscript.

Funding: Not applicable.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study may be obtained on request from the corresponding author.

Acknowledgements: Not applicable.

Conflicts of Interest: The author declares no conflict of interest.

Use of Generative AI: Generative AI tools were used for language editing, citation-format checks, and technical document formatting. The author reviewed and approved all changes and remains fully responsible for the manuscript.

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