

Methodological framework for transforming mountain rural settlements into international tourism villages

Mariam Tashyan ^{1*} , Sargsyan Lilit ^{1,2} , Sargsyan Tigran ¹ , Seyran Suvaryan ¹ 

1* Faculty of Geography and Geology, Service Chair, Yerevan State University, Armenia

2. NGO "Association for Sustainable Human Development", Armenia

*Correspondence: mariamtashyan@ysu.am ;

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Abstract: This study proposes a methodological framework for transforming rural settlements in mountainous regions into internationally recognized tourism villages in line with the UN Tourism "Best Tourism Villages" initiative (2021). The growing emphasis on sustainable rural tourism requires standardized approaches for evaluating and developing mountain villages with tourism potential.

The proposed framework integrates resource inventory, tourism potential assessment, infrastructure and service evaluation, governance analysis, and gap identification against international sustainability and tourism standards. The applicability of the model is demonstrated through the case of Byurakan village, located in the Aragatsotn region of the Republic of Armenia, which possesses significant natural, cultural, and scientific tourism resources.

The research employs a structured analytical approach combining qualitative assessment of tourism assets with comparative benchmarking against international criteria. The main contribution of the study is the development of a transferable methodological model that can be applied to mountain rural settlements seeking international tourism village designation.

The findings indicate that successful transformation requires not only the presence of tourism resources but also effective governance, strategic planning, community participation, and infrastructure development. The proposed framework provides a practical tool for policymakers and destination managers in mountainous tourism destinations.

1. Introduction

Mountainous regions worldwide are predominantly characterized by rural settlement structures, where traditional economic activities have historically been based on agriculture, livestock farming, and the utilization of natural resources. However, in many such regions, these sectors alone are no longer sufficient to ensure long-term socio-economic sustainability, leading to outmigration, limited income diversification, and uneven regional development. In this context, rural tourism has emerged as an alternative development pathway that enables the diversification of rural economies while preserving local cultural and natural assets.

Today, the United Nations Tourism Organization (UN Tourism) emphasizes that rural areas can be effectively developed through sustainable tourism models, particularly through the transformation of villages into tourism destinations. Initiatives such as the "Best Tourism Villages" programme highlight the potential of rural settlements to become

part of a global network of tourism villages that promote sustainability, heritage preservation, and community well-being. Accordingly, rural tourism is increasingly viewed not only as a complementary economic sector but also as a strategic tool for rural transformation and resilience.

This perspective suggests that rural villages can be developed more effectively through structured tourism development strategies, especially when they are conceptualized as tourism villages under internationally recognized frameworks. Such an approach may enhance accessibility to markets, improve destination visibility, and accelerate sustainable rural development.

According to Lane (Lane, 1994), rural tourism encompasses tourism activities that are located in rural areas, are rural in scale, and functionally depend on the countryside's natural, cultural, and human resources. A sustainable approach to rural tourism benefits not only tourists but also local communities and the environment (Streimikiene et al., 2020), (Sidali et al., 2015). Although location is considered a key defining characteristic of rural tourism in both developed and developing countries, sustainable development and community-based approaches are more prominent in the literature related to developing countries, whereas the experience dimension appears more frequently in literature concerning developed countries (Rosalina et al., 2021).

From 2020 to 2024, the rural tourism sector grew at a compound annual growth rate (CAGR) of 6.5% (Future Market Insights, 2025), driven by post-pandemic travel trends in which tourists seek opportunities to relax, be active, and experience something new and different together by choosing diverse and authentic tourism types (Ayazlar & Ayazlar, 2015). It is expected that between 2025 and 2035, rural tourism will continue to grow at an accelerated CAGR of 8.2%, due to increasing attention to sustainable development and rising demand for off-grid travel (Future Market Insights, 2025).

Considering the above, UN Tourism (UN Tourism, n.d.) implements a range of initiatives aimed at promoting rural tourism, among which the creation of tourism villages constitutes a key strategic direction. In 2021, under the UN Tourism for Rural Development Programme, the "Best Tourism Villages" initiative was launched, enhancing the role of tourism in rural development by recognizing and safeguarding rural areas, including their notable landscapes, knowledge systems, biodiversity, and cultural heritage. Currently, the list includes 52 tourism villages from various regions around the world (UN Tourism, 2025).

Aligned with international trends, the Republic of Armenia, under the new Law on Tourism adopted in 2023, defines (Article 3, Clause 33) a 'tourism village' as a rural locality designated by a governmental decision and characterized by the presence of significant tourism resources (Arlis, 2023). Following this, in 2024, a legal act was adopted establishing the minimum requirements for the designation of tourism centers or tourism villages, including special urban planning and environmental regulations and the approval of development goals, priorities, and implementation measures (Ministry of Economy of Armenia, 2024). In 2025, this process was further advanced by the Governmental Decision 'On the Designation of Tourism Villages (Arlis, 2025).

The aim of this study is to develop a methodological framework for transforming rural settlements in mountainous regions into internationally recognized tourism villages, using Byurakan village (Aragatsotn region, Armenia) as a case study.

2. LITERATURE REVIEW

The issues of rural tourism and the development of tourism villages have been extensively addressed in recent international scientific literature. Rural tourism development is widely recognized as an important tool for regional development,

contributing not only to economic growth but also to the preservation of cultural heritage and the social empowerment of local communities.

Recent studies, however, indicate that rural tourism also presents certain structural challenges when it is implemented without a sustainable planning framework. Li Yanan, Muhammad Azzam Ismail, and Asrul Aminuddin, in their systematic literature review "How has rural tourism influenced the sustainable development of traditional villages? (Li et al., 2025)," analyzed 92 publications from 45 scientific journals published between 2000 and 2023. Their findings suggest that the expansion of tourism-related land use and large-scale relocation processes may weaken traditional village structures and lifestyles. In many cases, profit-driven tourism development risks transforming traditional villages into cultural display areas or "museums," rather than supporting genuine sustainable development.

These findings highlight the necessity of structured governance and policy mechanisms in rural tourism development. In this context, the World Tourism Organization (UN Tourism, formerly UNWTO) introduced the "Best Tourism Villages by UNWTO" initiative, aiming to promote sustainable rural development and to recognize villages that successfully integrate tourism development with the preservation of community values. This initiative can be considered a global benchmark framework for balancing tourism growth and sustainability in rural areas.

Building on this framework, Mohammad Reza Asadizarch, in "How Rural Tourism Events Contribute to Villages Being Nominated as Best Tourism Villages by the UNWTO" (Asadizarch, 2025), identifies key selection criteria, including tradition and cultural heritage, sustainability, accessibility and infrastructure, innovation, social participation, and economic benefits. These criteria emphasize that successful tourism villages require not only physical resources but also active community engagement and effective governance structures.

The socio-cultural impacts of rural tourism have also been widely discussed in the literature. Nurlena, Riza Taufiq, and Musadad (2021), in their case study of Tanjung Tourist Village in Indonesia, demonstrate that tourism development can significantly strengthen social cohesion in rural communities. Their findings further reveal that tourism contributes to increased community participation and empowerment, including women's involvement, while simultaneously supporting the preservation of local cultural expressions and traditions.

From an economic perspective, rural tourism plays a particularly significant role in developing countries. Risdawati, Karinawati, and Pertiwi (2020) emphasize that tourism constitutes one of the most important sources of foreign exchange at the national level. Moreover, the tourism village model positions local communities as primary actors in development processes, as rural residents are directly involved in the organization and management of tourism activities.

In the Armenian context, Gayane Tovmasyan (2022) highlights the importance of rural tourism in supporting economic growth, cultural heritage preservation, and environmental protection. Her work further discusses the "Best Tourism Villages" initiative, under which villages are evaluated based on cultural and natural resources, economic, social, and environmental sustainability, tourism development, infrastructure, and safety. Additionally, she emphasizes national-level initiatives aimed at promoting rural tourism and ensuring balanced regional development.

Despite the growing body of literature, there remains a significant research gap regarding the development of structured methodological frameworks for transforming rural settlements into tourism villages, particularly in mountainous contexts such as Armenia. Existing studies primarily focus on impacts, criteria, or individual case studies, while comprehensive transformation methodologies aligned with international frameworks remain underexplored.

Therefore, it is essential to systematically examine the formation and development processes of tourism villages in Armenia, integrating international best practices and adapting them to local geographical, cultural, and institutional conditions.

3. METHODOLOGY AND RESULTS



Map 1. The study area of the village of Byurakan (Generated by Google Earth Pro)

Byurakan village (Map 1) (32 km²) is located in the Aragatsotn Province of the Republic of Armenia and is administratively included within the enlarged Ashtarak community (Ministry of Territorial Administration and Infrastructure of Armenia, n.d.), on the southeastern slope of Mount Aragats, on the left bank of the Amberd River (Hartunyan, 2003).

As of the beginning of 2025, the village's de facto and permanent population numbered 4201 and 4334 persons, respectively (National Statistical Service of Armenia, 2026). The primary occupation of the local population is in the agricultural sector, particularly animal husbandry; however, in recent years, the service sector, including tourism, has been rapidly developing.

In this study, the tourism potential of Byurakan is presented in accordance with the criteria established by UN Tourism under the "The Best Tourism Villages" initiative.

3.1. Natural and Cultural Resources

A) Natural Resources

Byurakan dendropark. On November 20, 2017, an agreement was signed between the Ministry of Nature Protection of the Republic of Armenia and the Byurakan Astrophysical Observatory named after Viktor Hambardzumyan, according to which the observatory's territories, rich in flora and fauna, were granted the status of a dendropark (BAO, n.d.-a). The park covers approximately 30 hectares and includes around 80 species of trees and plants, including several rare species, some of which were personally imported from abroad by Viktor Hambardzumyan.

Flora of the dendropark. The park hosts more than ten species of spruce, including rare silver spruces, as well as pine, thuja, oak, Russian birch, ash, poplar, linden, and numerous fruit trees such as apricot, pear, peach, walnut, apple, plum, cherry, quince, and hawthorn, among others (BAO, n.d.).

Fauna of the dendropark. The area is inhabited by a variety of bird species, including woodpeckers, hoopoes, thrushes, starlings, jays, crows, magpies, owls, doves, bee-eaters, larks, redstarts, nightingales, sparrows, swifts, and occasionally orioles and other species (BAO, n.d.).

The "Tsgnavory" cave shelter (Hermit's Cave Shelter), dating back to the 13th–14th centuries, is located above the bridge on the Byurakan–Orgov highway (Arlis, 2002). The cave located near Byurakan's Zizi Stone, which was recently discovered by speleologists, also represents a site of natural and touristic interest (Wikiloc, 2026).

B) Historical and Cultural Resources

Byurakan Astrophysical Observatory. The observatory was founded in 1946 at the initiative of academician Viktor Hambardzumyan, on the southern slope of Mount Aragats. It is equipped with 12 observational instruments, including the largest 2.6-meter Cassegrain reflector telescope and a 1-meter Schmidt telescope (BAO, n.d.).

Viktor Hambardzumyan House-Museum. The museum was opened in 1998 on the occasion of the 90th anniversary of the eminent scientist.

Churches. The village hosts the churches of St. Hovhannes (10th century) and St. Artavasik (7th century), which attract both local and international visitors (Etchmiadzin Library, n.d.).

Catholics' "Haykashen" summer residence. Byurakan formerly served as the summer residence of Armenian Catholicos. The two-story patriarchal residence was designed by architect Rafael Israelyan in December 1968 (Risraelyan, n.d.).

Fortresses. The archaeological and historical heritage of the area includes the "Aytzaberd" and "Inaklu Dar" fortresses (2nd–1st millennium BCE), with their associated settlements and burial grounds, the "Shishkond" fortress, and the "Amberd" fortress complex with its secret passage, khachkars, palace, chapel, bathhouse, hypocaust water-supply system, defensive walls, and cemetery, dating from the 10th–14th centuries (Hushardzan, n.d., Amberd Historical and Cultural Reserve).

Settlements. Medieval settlements dating from the 10th–18th centuries include "Oyugh," "Sopanes," and "Kyotaklu," as well as residential houses where the prominent Armenian composer Komitas lived and taught. The village also contains dozens of khachkars (cross-stone) (12th–13th centuries) and vishapakars (dragon stones) (2nd millennium BCE) (Arlis, 2002).

Here we can calculate the Resource Density through this formula (Singer, 2008).

$$Density = \frac{Number\ of\ resources}{Area\ (km^2)}$$

According to the decision adopted by the Government of the Republic of Armenia — Government Decision No. 628 (May 29, 2002), which approved the State List of Immovable Historical and Cultural Monuments of the Aragatsotn Province of the Republic of Armenia, a total of 78 immovable historical and cultural monuments have been officially registered in the settlement of Byurakan: Number of resources are 78, and the area is 32 km² so the density is equal:

$$Density = \frac{78}{32} = 2,4375$$

This means that, on average, approximately 2–3 historical and cultural resources are located within each 1 km² of the area. The above indicates a high concentration of historical and cultural heritage in the settlement and creates favorable conditions for the development of tourism routes and cluster-based growth.

3.2. Promotion and Conservation of Cultural Resources

In the Republic of Armenia, the preservation of cultural heritage constitutes one of the priority directions of state policy, aimed at the inventory, protection, and safeguarding of cultural assets, as well as the prevention of their illicit export, import, and illegal transfer of ownership rights. For this purpose, by Decision No. 501 of October 25, 1994, adopted by the Government of the Republic of Armenia, a Department for the Protection of Cultural Values was established within the system of the Ministry of Culture of the Republic of Armenia. Subsequently, by Government Decision No. 202 of March 6, 2002, it was reorganized into a separate subdivision of the Ministry, namely the Cultural Values Preservation Agency (Agency for Cultural Preservation, n.d.). The Agency carries out its activities in accordance with the RA Law "On the Export and Import of Cultural Values" and other legal acts, ensuring compliance with international obligations. The legal framework takes into account the requirements of the following international conventions (ARLIS, 2012): "On the Means of Prohibiting and Preventing the Illicit

Import, Export and Transfer of Ownership of Cultural Property” (Paris Convention), “On the Protection of Cultural Property in the Event of Armed Conflict,” “European Cultural Convention.”

In addition, Armenia has ratified the Council of Europe Framework Convention “On the Value of Cultural Heritage for Society,” which entered into force for the Republic of Armenia on December 1, 2012 (ARLIS, 2012). The aforementioned legal and institutional foundations have subsequently served as the basis for the development of sectoral policies, in particular the RA Law “On Tourism,” annual development strategies, and other programmatic documents. This approach considers cultural heritage not only as an asset subject to protection, but also as an important resource for territorial development and the promotion of tourism.

In this context, tourism development has been included among the priority directions of the 2022–2026 community development strategy of Ashtarak (Ashtarak Community Development Program, 2022–2026). The strategy also encompasses the village of Byurakan, which necessitates the development of a comprehensive tourism development program in the community, based on a holistic assessment of existing resources, analysis of potential, and identification of strategic directions for development.

A successful example of the preservation of cultural and scientific heritage is the Margaryan Survey (First Byurakan Survey), which was inscribed in 2011 in the “Memory of the World” Register of UNESCO. It was created at the Byurakan Astrophysical Observatory by the renowned Armenian astronomer Benjamin Markarian and his colleagues through astronomical observations conducted between 1965 and 1988. This survey includes large-scale photometric studies of the Universe and is considered one of the most significant scientific achievements of twentieth-century astrophysics, possessing exceptional documentary value (Aras.am DFBS, n.d.).

In addition to tangible and scientific heritage, intangible cultural heritage is also being developed within the community. The village hosts the “Tonatsuyts” cultural center, whose objective is to restore, preserve, and present traditional Armenian music, festive rituals, and folk crafts to both residents and tourists (Tonatsuyts Cultural Center, n.d.). The center organizes experiential programs, including ritual ceremonies, the traditional process of lavash baking, pottery-making, and other cultural activities, which contribute to the preservation of community identity and the development of experiential tourism (Armenian Public Radio Archive, 2026).

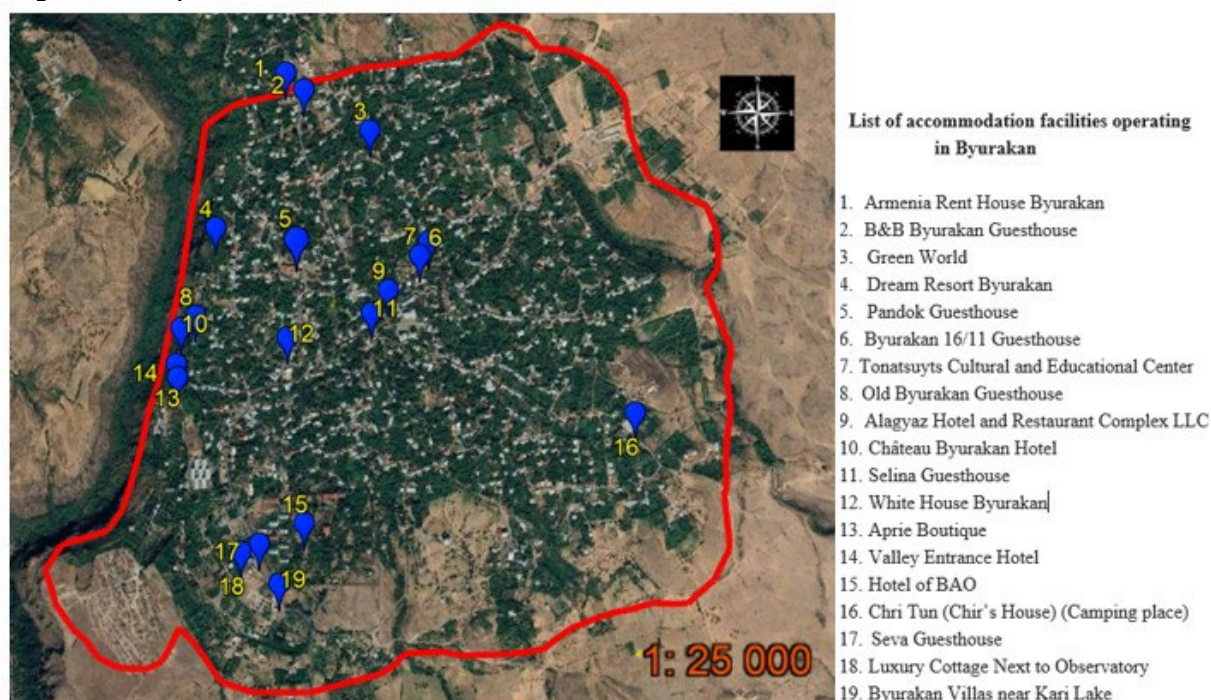
Thus, the combined potential of tangible, intangible, and scientific cultural heritage available in the village of Byurakan may be regarded not only as a factor in preserving local identity, but also as a foundation for a systematic policy of Promotion and Conservation of Cultural Resources. The inventory, protection, valorization, and public presentation of cultural resources simultaneously ensure the long-term safeguarding of heritage, enhance the visibility and attractiveness of the area, and create a competitive environment necessary for sustainable tourism development. Consequently, the effective management of cultural resources contributes to the expansion of educational and cultural programs and to the socio-economic activation of the community, ensuring an integrated approach that combines conservation with promotion.

3.3. Economic Sustainability

According to the 2022–2026 Five-Year Development Program of the Ashtarak community, which includes the settlement of Byurakan, the strategic objective of the community is the continuous improvement of socio-economic conditions and infrastructure through the implementation of green economy principles, thereby ensuring sustainable development. Within this framework, the community is envisioned as a prosperous, competitive, and investment-attractive area.

To effectively utilize local potential, priority is given to economic, educational, and tourism activation through the design and implementation of territorially balanced and sustainable development programs. These approaches apply to all settlements within the community, including Byurakan.

A number of economic entities providing tourism-related services operate in the settlement, particularly accommodation and catering facilities. These establishments are presented in Map 2 (Information about the accommodation facilities is derived from hotel booking websites).



Map 2. The List of accommodation facilities operating in Byurakan, (Generated by Google Earth Pro)

The map provides a visual representation of the spatial distribution and degree of concentration of accommodation facilities within the village, enabling an assessment of their locational patterns. It serves as an important tool for tourists, facilitating informed and well-grounded decision-making by taking into account factors such as location, accessibility, and spatial organization.

For example, **Château Byurakan Hotel** (Château Byurakan Hotel Facebook Page, n.d.) is an operating hotel facility comprising six rooms (two standard, two deluxe, and two suites). The hotel offers both indoor and outdoor heated swimming pools, a sauna, open-air pavilions, restaurant and lounge services, and event-hosting opportunities for up to 100 guests. In 2025, the hotel hosted approximately 30 visitors, including 11 international tourists.

One of the most significant initiatives contributing to alternative and community-based tourism development in Byurakan is **Chir's House** (Chirs House Facebook Page, n.d.), an agro-production and tourism complex. The organization's primary objective extends beyond dried-fruit production to the integration of agricultural activities with tourism services, thereby forming a sustainable agro tourism model and creating alternative income sources for local residents.

The complex applies an experiential tourism approach, allowing visitors not only to observe but also to participate directly in production processes. Tourists are involved in harvesting, fruit processing (pitting, slicing, drying), and the preparation of traditional products, including fruit sujukh and lavash baking. This format contributes to the preservation of local cultural heritage, the transfer of agricultural knowledge, and the enhancement of the overall tourism experience.

Circular economy principles are implemented within the production system. Waste is minimized, while fruits unsuitable for drying are reused in secondary processing, particularly for brandy production. In addition, the enterprise promotes organic agriculture, including the cultivation of organic strawberries and mushrooms. The use of

solar energy ensures stable greenhouse temperatures throughout all seasons, enabling continuous production while reducing energy costs.

The organization's development has been supported through international cooperation and investment programs. Financial and advisory assistance has been provided by Austrian Development Bank, GIZ, and NABU. These partnerships aim to promote green and organic agriculture as well as rural tourism development. The enterprise has also participated in various European initiatives and collaborated with state and local authorities to implement community development projects.

From an economic perspective, the complex has the capacity to host up to 150 visitors simultaneously, and approximately 10,000 visitors were recorded in 2025. Operations began in 2016, and development programs have contributed to the establishment of stable production and tourism infrastructure. Beyond tourism services, the enterprise purchases fruit from local farmers regardless of quantity, thereby stabilizing rural incomes and stimulating the local economy. Additional services include camping tours, overnight stays, and nature-based recreational activities such as fishing.

In conclusion, Chir's House can be regarded as a successful example of community-based, environmentally responsible, and experiential tourism in Byurakan. By integrating production, education, and tourism services, the initiative contributes significantly to the socio-economic sustainability and long-term economic resilience of the area.

In recent years, the Byurakan Observatory has implemented numerous scientific projects and grant programs, which not only promote scientific advancement but also ensure the economic sustainability of the institution. More than 15 projects and grants provide approximately AMD 545 million in multi-year funding, including hundreds of millions of drams in investments, USD 40,000 in international support, and programs for mobility, conferences, research, and international collaboration (Table 2 and 3) (BAO Report, 2025).

Table 2. Byurakan Observatory – Summary of Projects and Grants

Project Code	Years	Funding (AMD/USD)
21AG-1 C044	2021–2026	166.800.000 AMD
21AG-1 C053	2021–2026	153.000.000 AMD
22RL-1 C039	2022–2027	101.840.000 AMD
24RL-1 C010	2024–2029	107.000.000 AMD
ANSEF	2025–2026	7.500 USD
ANSEF	2025–2026	7.500 USD
VH Project	2025–2026	5.068.500 AMD
VH Project	2025–2026	5.068.500 AMD

Table 3. Byurakan Observatory – Grants and International Programs (2025–2026)

Project / Grant	Year(s)	Funding (AMD/USD)
EU Erasmus+ International Credit Mobility	2025	—
IAP Visitors Grant	2025	—

VA Prize Foreign Fellowship Grant	2025 –2026	—
VA Prize Foreign Fellowship Grant	2025 –2026	—
RA MoESCS HESC Scientific Events – Armenian-Georgian Colloquium	2025	775.000 AMD
RA MoESCS HESC Scientific Events – ASBD-3	2025	950.000 AMD
RA MoESCS HESC Conference Grants – 4RASS 2025	2025	1.000.000 AMD
UNESCO– Astronomical Heritage of the Middle East 2	2025	20.000 USD
UAU Division C – CAP Conference	2026	5.000 USD
VA Prize Scientific Events – CAP-2026	2025 –2026	1.017.500 AMD
VA Prize Scientific Events – 10BISS	2025 –2026	1.520.550 AMD
VA Prize Scientific Events – BAO-80	2025 –2026	1.520.550 AMD
YSU Educational Program Grant (ALMA School 2026)	2026	—
RA MoESCS HESC Scientific Events – CAP-2026	2026	—
RA MoESCS HESC Scientific Events – BAO-80	2026	—
RA MoESCS HESC Scientific Events – 10BISS	2026	—

These figures demonstrate that the Observatory operates systematic, multi-year, and multi-source funded programs, which ensure both sustainable scientific activity and continuous economic development.

3.4. Social Sustainability

The development plan of the Ashtarak community, which includes the settlement of Byurakan, identifies social protection as one of the priority directions of community policy. The strategic objective is to support socially vulnerable and disadvantaged families by improving their living standards and reducing social inequalities.

According to program data, the proportion of families receiving social assistance from the community amounts to approximately 18% of the total number of socially needy families. The community operates a Department of Social Assistance and Health Affairs, whose activities are aimed at increasing the level of social welfare among the population. Within the framework of social protection, the provision of benefits and financial support is envisaged for both families registered in the “Paros” system and those in socially disadvantaged conditions who are not registered in the system. In addition, cooperation is carried out with charitable organizations to provide material assistance (such as goods, livestock, and other resources).

An important institutional component for ensuring social sustainability is also the activity of the Byurakan Youth Center (Facebook Profile of Byurakan Youth Center, n.d.). The center serves as a platform for non-formal education and community activation, organizing educational, cultural, and civic events, volunteer programs, and skills development initiatives. This activity contributes to the social inclusion of young people, the cultivation of civic responsibility, and their active participation in community life, which in the long term strengthens the community’s human capital and demographic sustainability.

Within the framework of the research, the results of a sociological survey indicate that the majority of respondents are aware of the village’s historical, cultural, and natural resources and have a fairly clear understanding of the concept of “sustainable tourism” as well as its potential economic, social, and ecological benefits. The community already hosts several enterprises that align with the principles of sustainable development, in

particular the Tonatsuyts Cultural and Educational Center and the Chir's House Agro-Tourism Complex.

These destinations simultaneously ensure the integration of the three main components of sustainable development:

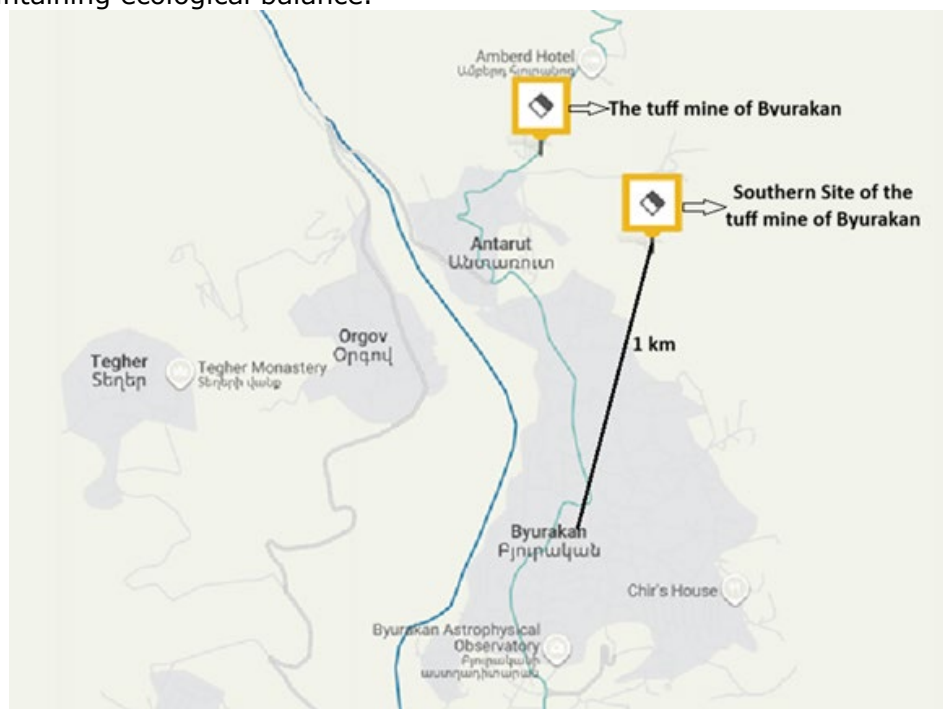
- **Ecological:** reduction and recycling of production waste,
- **Social:** active involvement of the local population, provision of employment opportunities and skills development,
- **Economic:** income generation and its reinvestment in community development programs.

Specifically, at Chir's House, residents are engaged not only in production processes (harvesting, fruit processing, and other manufacturing activities) but also in guiding tourists and providing experiential educational services. This enables community members to directly observe and benefit from the economic and social advantages of tourism. At Tonatsuyts, children and young people participate in cultural programs, contributing to the preservation of traditions and intergenerational knowledge transfer, demonstrating how socio-cultural engagement can be effectively integrated with tourism initiatives.

In conclusion, it can be noted that Byurakan has established important prerequisites for social and economic sustainability, and the community is developing a practical and conscious model of sustainable tourism, where residents not only recognize the significance of tourism but are actively involved, consciously utilize its benefits, and observe their impact on their own experiences.

3.5. Environmental Sustainability

According to the decision of the Ministry of Environment of the Republic of Armenia (Order N 109-L, April 2, 2024) approving the forest management plan of the "Aragatsotn Forestry" branch of "Hayantar" SNPO, the territory of the Byurakan Forest Administration covers 3.739.6 hectares, of which 1.180.1 hectares are forested. The area hosts relict forests, endemic plant species, medicinal plants, and edible flora, representing unique elements of biodiversity that play a crucial role in regulating the local microclimate and maintaining ecological balance.



Map 3. Map of the Byurakan village quarries, source: Geological Fund of Armenia website

The Byurakan tuff deposit (Map 3, which was obtained from the GEO Fund website (GEO Fund, n.d.)) is located approximately 1.0 km northeast of Byurakan village in the Aragatsotn Province of Armenia. Access roads to the quarry pass through Ashtarak, Byurakan, Orgov, Aghavnadzor, and Antaratut villages, which are situated in the immediate vicinity of the deposit and serve industrial purposes (GEO Fund, n.d., Mineral Potential of Armenia).

The environmental condition of the quarry can be characterized as subject to localized anthropogenic pressure, primarily associated with open-pit mining, accumulation of extraction waste, dust emissions, and potential impacts on soil and groundwater systems. Notably, these impacts may affect local ecosystem stability, cause soil degradation, air pollution, and influence water resources at the local scale; however, they do not reach catastrophic or unmanageable levels.

These risks are particularly significant given the proximity of nearby settlements and the region's astronomical and ecotourism potential, where disturbances to the landscape and visual values could negatively affect tourism attractiveness. In summary, the environmental pressures of the Byurakan tuff deposit are manageable, but continuous monitoring and effective environmental management measures are required to prevent adverse impacts on the surrounding environment and community health.

3.6. Tourism Development and Value Chain Integration

Tourism development in Byurakan community is conditioned both by the effective utilization of natural and historical-cultural resources and by the interconnection of the different components of the tourism value chain, including transportation, accommodation, catering, recreation, and specialized experiences. As a result, a multi-sectoral tourism offer is being formed within the community, integrating adventure, wine, family, and scientific (astronomical) tourism, most of which have already been addressed in the present study.

An illustrative example of adventure tourism development is the "*ZipWine*" *tourism complex* (ZipWine, n.d.), which is designed for enthusiasts of extreme tourism. Through the zipline flight, visitors travel across the gorge from Byurakan to the village of Orgov. The area includes a wine tasting hall, which contributes to the development of wine tourism (ArmTimes, n.d.). At the same time, family-oriented recreational infrastructure has been established, including a swimming pool, a tennis court, and newly constructed cottages that provide comprehensive accommodation and leisure conditions. Thus, the complex integrates active recreation, rural experiences, and the consumption of local products, forming an integrated tourism service.

Scientific or astronomical tourism occupies a particularly important position in Byurakan, with its main center being the **Byurakan Astrophysical Observatory**. According to 2025 data, the observatory hosted approximately 32,607 visitors (schoolchildren, students, citizens of the Republic of Armenia, foreign tourists, and VIP guests), generating revenues of 28,753,700 AMD. In Diagram 1, the stability of tourism flows is visible (the data are taken from the Byurakan Observatory Annual Report for 2025.).

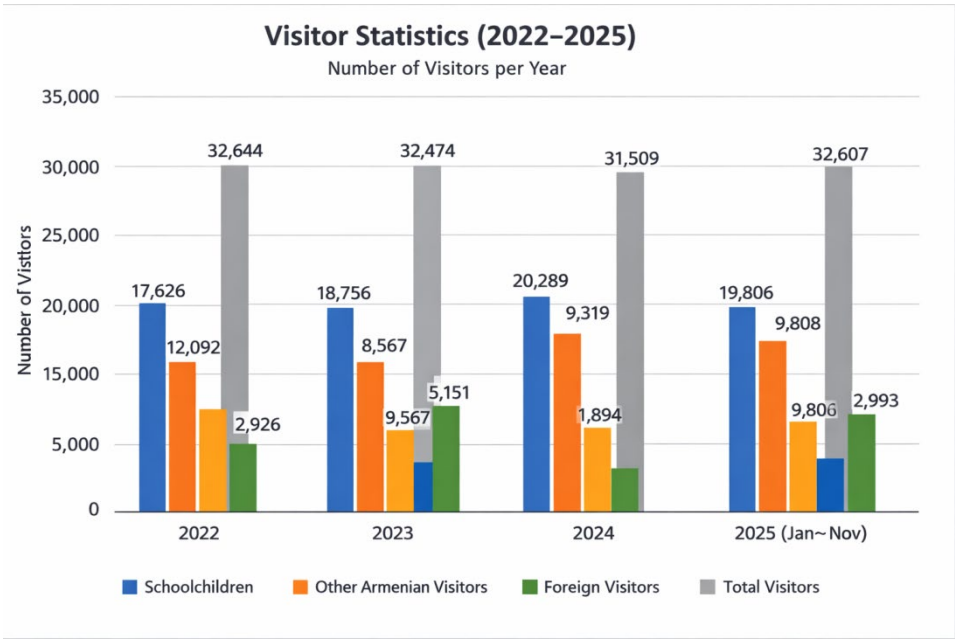


Diagram 1. Tourist Flow to Byurakan Observatory (2022–2025)

The observatory also operates a guesthouse, which accommodated 760 tourists during the same year, 202 of whom were international visitors from 20 different countries (Armenpress, n.d.). The majority of visitors arrived from Russia, Croatia, Iran, Georgia, and other European countries. Their interest is mainly driven by the opportunity to observe unique astronomical phenomena, including meteor showers, as well as solar and lunar eclipses, in addition to participating in educational and scientific programs.

Tourism organization in Byurakan is carried out by both public institutions and private companies. The private sector is primarily engaged in providing accommodation, catering, and guiding services, offering package tours for both domestic and inbound tourists. The observatory provides both short-term visits and longer programs lasting 3–7 days (Tovmasyan, 2017). Interviews with tourism agencies indicate that such tours are generally organized according to demand rather than on a regular basis. The cost of a tour for an inbound tourist ranges between 305.000 and 320.000 AMD and typically includes accommodation, internal transportation, guiding services, meals, and entrance fees.

Moreover, in order to enhance operational systematization, a dedicated website entitled “Byurakan Observatory as a Center for Scientific Tourism” (Astrotourism Aras, n.d.) has been established. The website presents detailed and pre-calculated tourism packages that can be utilized by travel agencies, tour operators, and independent guides, thereby contributing to the standardization of tourism products and the improvement of service quality.

Specifically, the observatory’s tourism package includes:

- short daytime and nighttime visits featuring access to the largest 2.6-meter telescope and nighttime sky observations with smaller telescopes,
- medium-duration programs supplemented with astronomical lectures or scientific film screenings and catering services,
- long-term visits (with one or more overnight stays) combined with additional excursions within the observatory and the surrounding Byurakan area.

In the food and hospitality sector, facilities such as Byurakan Pandok, Ojakh Restaurant Complex, ZIPVAYN Byurakan Winery, and the Mnatsakanyans’ Gastro Yard (Facebook Page of Mnatsakanyan’s Gastro Yard, n.d.) operate, with the latter receiving more than 1.000 visitors annually. The Mnatsakanyans’ Gastro Yard was established under the United Nations Development Programme (UNDP) rural tourism development initiative and focuses on artisanal winemaking, thereby contributing to the enhancement

of local product value and the stimulation of community-based entrepreneurship. Through the collaboration between UNDP and the Ministry of Territorial Administration and Infrastructure of the Republic of Armenia, the “Integrated Rural Tourism Development” program has facilitated the establishment of new infrastructure in the community, including the Byurakan Studio and the Mnatsakanyans’ Gastro Yard. The Byurakan Studio (Aragatsotn Regional Administration webpage, 2019) functions as an art gallery and creative production space, where recycled paper materials are used for artistic production, and visitors are actively engaged in participatory experiences, creating their own artworks. This model supports the development of creative tourism and diversifies the local tourism offering.

Additionally, the community has developed production infrastructure with a focus on wellness and ecological sustainability, such as the Immortelle essential oils production facility, which manufactures natural skincare products and is planned to include spa services in the future. This initiative expands opportunities for the development of wellness tourism in the region.

From a gastronomic tourism perspective, the Mnatsakanyans’ Gastro Yard offers visitors the opportunity to observe wine production processes and participate in tastings, creating experiential consumption around local products and strengthening the interconnections between agriculture, processing, hospitality, and tourism within the value chain. The development of these linkages not only enhances Armenia’s tourism map but also generates local employment and promotes community socio-economic sustainability.

Overall, the experience in Byurakan demonstrates that an integrated rural tourism model, combining local production, cultural heritage, creative industries, and hospitality services, contributes to increased community competitiveness, income diversification, and sustainable territorial development. Such initiatives can be regarded as examples of effective value chain integration, forming a comprehensive tourism ecosystem.

Simultaneously, the integrity of the tourism value chain in Byurakan is further enhanced by innovative initiatives. Notably, the community hosts a snail farming enterprise (Sunny Snails) (Facebook Page of Sunny Snails Farming, n.d.), which engages in the ecologically sustainable breeding and processing of edible snails. This farm provides a range of snail-based culinary products, organized excursions, and educational visits, establishing a direct link between agricultural practice and tourism demand.

The snail farm exemplifies how a specific agricultural product can serve as the foundation for a tourism offering that integrates production, educational excursions, tastings, and local cultural experiences. Visitors are given the opportunity to continuously observe and participate in these processes, thereby enhancing the level of experiential tourism within the community.

In conclusion, a multi-component tourism system is emerging in Byurakan, where various services complement one another to create an integrated value chain. Such an approach contributes to the economic activation of the community, the diversification of tourism offerings, and the enhancement of the region’s competitiveness.

3.7. Governance and Prioritization of Tourism

Tourism development in Ashtarak community is regarded as a strategic lever for socio-economic progress, the effective governance of which can ensure increased territorial competitiveness, expansion of local employment, and sustainable improvement in the population’s standard of living. The community is characterized by substantial natural, cultural, and infrastructural potential necessary for the systematic and complementary development of the main branches of tourism. This creates opportunities to shape a diversified tourism offer targeting both inbound and domestic markets. Tourism is included among the priority directions of the community’s 2022–2026 development strategy as an important mechanism for economic diversification and income localization. The strategic framework envisages the preparation of a comprehensive tourism development program based on a thorough assessment of available resources, situational analysis, and the identification of development priorities.

Such a governance approach allows tourism to be viewed not as a set of isolated initiatives, but as an integrated system of interrelated subsystems.

From the perspective of developing the natural tourism potential, particular importance is attributed to the Kasagh River, which flows through the community's territory. Its gorges, picturesque landscapes, and natural recreational zones provide favorable conditions for the development of ecotourism, adventure tourism, and family-oriented leisure activities. In addition, the community is rich in historical and cultural monuments of both national and local significance, forming a solid foundation for educational and cultural tourism.

Priority tourism directions include historical-architectural tourism, winter tourism, adventure tourism, rural tourism, and ecotourism. The community's competitive advantages are determined by its favorable geographic location and transit accessibility, well-developed transport infrastructure, rich historical and cultural heritage, environmentally clean and attractive natural surroundings, the potential for year-round tourism organization, and a distinctive local cuisine.

In terms of recreational and leisure infrastructure, an important role is played by both natural and organized areas, including the recreational zones of Ashtarak Gorge and Ashtarak Lake, as well as other green spaces and parks. However, mass deforestation during the energy crisis of the 1990s negatively affected the urban green fund and ecological environment, which currently necessitates the implementation of restoration and landscaping programs.

One of the innovative directions of tourism governance is the development of wine tourism, which is based on the revival of local cellar-based winemaking traditions. Preserved traditional cellars are being transformed into sites for visits and experiential learning, contributing simultaneously to the preservation of cultural heritage and to local economic activation. This process is supported by initiatives implemented with the assistance of the United Nations Development Programme, aimed at integrated rural tourism development, which have facilitated the formation of new wine tour products. The integration of local winemaking traditions into the tourism product creates effective opportunities for community branding and for extending the local value chain.

Within Byurakan village, the governance and prioritization of tourism development are carried out within the framework of community strategic planning, aligned with the broader socio-economic development policy of Ashtarak community. Tourism in the village is considered a key direction of local development, aimed at improving living standards, expanding employment, and diversifying income sources. Community development programs stipulate that the implementation of tourism initiatives is expected to increase the share of income-generating households from 15 percent to 60 percent. This indicator reflects both the strategic orientation of local authorities and the presence of clearly defined social impact benchmarks.

Tourism development is promoted through a public–community–private partnership model that engages individual entrepreneurs, local organizations, and residents. The main sources of financing are generated through local investments, small and medium-sized enterprise initiatives, and measures implemented within community development programs. This approach contributes to the efficient use of local resources and to the decentralization of economic responsibility.

Thus, tourism governance in Byurakan is characterized by systematic planning, active stakeholder participation, and measurable socio-economic objectives, creating the preconditions for sustainable and long-term development.

3.8. Infrastructure and Connectivity

Among the key preconditions for tourism development in Byurakan village, transport and engineering infrastructures play a decisive role, as they directly determine territorial accessibility, the frequency of visits, and the effective organization of tourism services. Approximately 75% of the total length of intra-community roads and streets in the village are asphalt-paved, while about 25% remain unpaved (*Annual Work Plan of the Ashtarak*

Community, 2026). The relatively high level of paving contributes to transport convenience and reduces the seasonality of visits; however, unpaved sections—particularly under unfavorable weather conditions—may restrict accessibility. For this reason, the local administration continuously monitors and addresses this issue to prevent negative impacts on the stability of tourist flows.

The community is largely equipped with essential public utilities. Approximately 95% of residents benefit from a 24-hour drinking water supply, 90% has access to the gas distribution network, and electricity supply is provided by Electric Networks of Armenia CJSC (ENA) (ENA, n.d.). Street lighting systems operate along roughly 75% of the streets, with a significant share based on energy-efficient and LED technologies. These indicators enhance the viability and safety of the settlement and constitute important prerequisites for the development of accommodation facilities, overnight stays, and leisure services. At the same time, the partial deterioration of the irrigation system and the need for repairs highlight the ongoing requirement for infrastructural modernization, which may also affect the full realization of agricultural and rural tourism potential.

From the perspective of spatial planning, it is also important to note that Byurakan effectively functions as an access hub for nearby tourist attractions. Although several well-known sites are not administratively located within the village boundaries, visitors frequently perceive them as part of the broader Byurakan tourism area. One such site is Amberd Hotel (Amberd Hotel, n.d.), which is often selected as a place for accommodation and recreation, thereby complementing the village's tourism offer.

Among the high-mountain natural resources, The Mountain Aragats (Potosyan, 2022) stands out as the highest peak in Armenia, with an elevation of 4.090 meters, and is considered one of the country's prime destinations for adventure tourism, particularly mountaineering. The mountain has four summits—the Southern (3.887 m), Western (3.995 m), Northern (4.090 m), and Eastern (3.908 m) (ArmGeo, n.d.)—each of which effectively functions as an independent site for tourism activities. Another significant natural attraction is the lake Kari (National Statistical Committee of Armenia, 2023), a glacial lake located on the slopes of Mount Aragats at an altitude of approximately 3.200 meters. Although neither the lake nor the mountain lies within the administrative boundaries of the village, most visitors pass through Byurakan on their way to these destinations, effectively turning the village into a transit zone. A similar function is served by The Monastery Tegher (Or Dgher Monastery) (Harutyunyan, 1992, Barkhudaryan, 1963, *Hushardzan*, n.d., Archive), an important historical and cultural monument of the region that attracts both educational and pilgrimage tourism.

It can therefore be argued that these sites collectively form an "extended tourism zone" of Byurakan, where administrative boundaries become secondary and the village is perceived by visitors as a unified brand and a regional center. This perception reflects the settlement's high level of recognition and the formation of a distinct territorial identity, which constitutes a significant competitive advantage in the tourism market. In other words, Byurakan functions not only as an independent destination but also as a service, logistics, and hospitality platform for surrounding attractions.

Thus, the relative development of infrastructure combined with functional linkages to nearby tourism resources creates the conditions under which Byurakan can emerge as a regional tourism hub, ensuring growth in visitor numbers and contributing to the diversification of the local economy.

3.9. Health, Safety, and Security

Byurakan village, due to its favorable geographical location, is distinguished by its mountainous environment and rich natural conditions. These features contribute to the well-being of both local residents and tourists by providing clean air, a tranquil atmosphere, and restorative opportunities shaped by natural landscapes. At the same time, the elevated terrain and natural resources create a favorable foundation for the development of rural and ecotourism.

Among the potential risks for the village are certain representatives of the local flora and fauna, particularly venomous reptiles and some toxic plant species. However, these factors constitute general risks with limited impact, due to their relatively rare occurrence and manageable nature. Therefore, they are not considered significant or dominant threats in the context of tourism activities.

In terms of healthcare provision, primary medical services in Byurakan are organized and delivered through the village's medical point, which serves as the main healthcare support facility for both residents and visitors.

In terms of safety, Byurakan is classified as a peaceful and stable community. Visitor security is ensured not only through local community oversight but also by the supervision of the law enforcement authorities of the Republic of Armenia. At tourism sites and recreational areas, priority is given to maintaining visitor safety regulations and monitoring the quality of services. Some tourism service providers implement specific protocols to safeguard visitor security, emphasizing the importance of adhering to high safety standards (e.g., Zip Wine, Byurakan (*ZipWine Eco-Village*, n.d.)).

Furthermore, the developing tourism infrastructure in the region contributes to enhanced safety levels through organized excursions, informational services, and the involvement of local guides. Annually, thousands of visitors travel to Byurakan, indicating that the area provides a safe and conducive environment for tourism (ARKA News Agency, 2018).

4. DISCUSSION

In this study, Byurakan village was analyzed as a tourism destination within the broader context of developing mountain rural settlements into tourism villages. The results indicate that Byurakan meets the criteria established for the formation of tourism villages in the Republic of Armenia, particularly those defined under the "Minimum criteria required for declaring tourism centers or tourism villages," approved by the Minister of Economy of the Republic of Armenia on 6 September 2024. As a result of fulfilling these requirements, the village was officially included in the list of tourism villages of the Republic of Armenia in 2025.

These criteria encompass key dimensions of tourism village development, including the availability of cultural and natural resources, intangible cultural heritage, and unique tourism experiences, as well as the development of tourism infrastructure and the presence of qualified human resources in the sector. They also emphasize the preservation and promotion of cultural and natural heritage, alongside economic, social, and environmental sustainability. Additional requirements include the development of tourism value chains, effective governance structures, infrastructure development, connectivity, compliance with environmental standards, settlement aesthetics, public health, and safety conditions.

The analysis demonstrates that Byurakan has already developed a recognizable tourism identity, strongly associated with the presence of the Byurakan Astrophysical Observatory. The observatory functions not only as a scientific institution but also as a significant center of scientific tourism, attracting international visitors and enhancing the global visibility of the village.

The village is further characterized by rich natural and cultural resources. Of particular importance is the dendropark located within the observatory area, which serves as both an ecological and educational tourism site. In addition, Byurakan preserves extensive historical heritage ranging from the 2nd–1st millennia BCE to the present, including fortresses, churches, khachkars, and other archaeological assets. These resources create a diversified base for tourism product development.

Geographically, Byurakan plays a strategic role as a transit point toward key tourism attractions such as Tegher Monastery, Kari Lake, and Mount Aragats, the highest peak in Armenia. This location positions the village as an intermediate tourism hub and strengthens its role in regional tourism circulation.

The study also identified active forms of tourism-related cooperation and investment. Both public and private stakeholders are engaged in tourism development through grants, sponsorships, and international partnerships involving European, Asian, and other organizations. These initiatives are primarily aligned with sustainable tourism development principles.

The findings are consistent with existing literature on tourism villages, which highlights that rural tourism contributes to community engagement, cultural preservation, and economic diversification. In the case of Byurakan, gradual community involvement in tourism-related activities is evident, although further institutional coordination is required. Currently, tourism resources are not yet fully systematized or strategically managed, which limits their transformation into a structured international tourism product. Therefore, the establishment of a dedicated coordinating mechanism or tourism management body is essential to ensure a structured, tourist-centered development approach.

5. CONCLUSION

The findings of this study confirm that Byurakan village possesses significant potential for development as a tourism village within the framework of the proposed methodological approach for transforming mountain rural settlements into international tourism villages.

The village meets both national criteria defined by the Republic of Armenia and international standards, particularly those of the UN Tourism "Best Tourism Villages" initiative. Its natural, cultural, scientific, and geographical resources provide a strong foundation for inclusion in such global frameworks.

Strengthening Byurakan's position as a tourism village and its potential integration into international initiatives may contribute to increased tourist flows, enhanced investment opportunities, improved international visibility, and socio-economic development of the local community. However, achieving these outcomes requires adherence to sustainable tourism principles, preservation of cultural and natural heritage, active community participation, and effective governance mechanisms.

In conclusion, Byurakan represents a strong example of a mountain rural settlement with high potential to evolve into a structured and competitive international tourism village under sustainable development frameworks.

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