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REVIEW ARTICLE OPEN ACCESS

Sustainable Tourism and SDGs in the South Caucasus

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ABSTRACT

This study examines sustainable tourism practices in the South Caucasus region (Armenia, Azerbaijan, and Georgia) through the lens of the United Nations Sustainable Development Goals (SDGs). A scoping literature review was conducted, analyzing academic papers from Scopus and Web of Science databases. Content analysis and expert validation were employed to map synergies and trade-offs between sustainable tourism practices and the 169 SDG targets. The analysis of 94 papers reveals 434 connections, comprising 276 synergies and 158 trade-offs. Notable synergies were identified with SDG 8 (Decent Work and Economic Growth) and SDG 11 (Sustainable Cities and Communities). The study highlights region-specific challenges and opportunities, including the need for water resource management in Azerbaijan and the potential of wine tourism in Georgia. Findings underscore the importance of cross-border cooperation and tailored approaches to SDG implementation, considering each country's distinct characteristics. The research contributes to understanding the complex interactions between sustainable tourism and SDGs in the South Caucasus, offering insights for policymakers and stakeholders.

1 | Introduction

Situated at the crossroads of Europe and Asia, the South Caucasus, comprising Armenia, Azerbaijan, and Georgia, is a meeting point of cultures linked with its diverse landscapes and rich biodiversity. This convergence illustrates the relationship between society and the natural environment in the region. While defining the broader Caucasus as a distinct geographic area can be challenging from an academic perspective, the South Caucasus is more clearly delineated. It is bounded by the Black Sea to the west, the Caspian Sea to the east, the Greater Caucasus ridges to the north, and borders with Turkey and Iran to the south (Pototskaya 2024). The South Caucasus forms a significant part of the Caucasus Ecoregion, recognized as one of the world's biodiversity hotspots (Mumladze, Japoshvili, and Anderson 2020). This ecological richness, combined with the region's cultural

diversity stemming from its long history at the intersection of various civilizations, contributes to the South Caucasus's unique identity. The resulting blend of natural beauty and cultural heritage makes the South Caucasus an increasingly attractive destination for travelers seeking both scenic landscapes and rich cultural experiences (Schuhbert and Thees 2020).

In an era marked by increased environmental awareness and socio-economic progress, the rise of sustainable tourism is a practical response to changing travel paradigms (Gupta et al. 2024). Sustainable tourism goes beyond merely traveling green; it represents a conscious approach that seeks to reduce ecological impact while maximizing socio-cultural benefits (Niedziółka 2014). Amid growing concerns for ecological integrity and cultural authenticity, sustainable tourism has moved from a niche concept to an integral part of responsible travel.

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As travelers increasingly seek authentic experiences and immersive engagements, sustainable tourism practices have become crucial in preserving the cultural integrity and environmental health that make these experiences possible, thereby gaining prominence in the discourse of global travel and development (Budeanu et al. 2016).

However, the development of sustainable tourism in regions such as the South Caucasus presents complex challenges (UNEP 2024). Balancing carrying capacity and visitor demand is a significant issue, requiring strategic visitor management strategies to safeguard local ecosystems while accommodating high visitor volumes (Candrea and Ispas 2009; Bošković, Vujičić, and Ristić 2020). The tension between biodiversity conservation and adventure tourism necessitates enforcing activity codes and defining ecologically sensitive zones. Additionally, the desire for economic improvement through tourism can potentially disrupt conservation efforts and traditional livelihoods, highlighting the importance of initiatives that enable local communities as environmental stewards (Su, Wall, and Xu 2016; Purnamawati and Adnyani 2021).

Addressing these challenges requires a multifaceted approach. This includes adopting energy-efficient practices and sustainable transportation to reduce carbon emissions (Zeppel and Beaumont 2014), as well as effective marketing that showcases the region's natural beauty and cultural wealth without compromising authenticity (Pomeroy, Noble, and Johnson 2011). Ultimately, successful sustainable tourism development hinges on balancing ecological preservation, cultural heritage promotion, and equitable distribution of economic benefits (UNEP 2024).

Central to this inquiry is an examination of the complex connections between sustainable tourism and the SDGs. The SDGs, created by the United Nations, provide a comprehensive framework for scientific analysis, addressing global challenges related to well-being, economic prosperity, and environmental protection (Pradhan et al. 2017). In the context of sustainable tourism, scholars have critically analyzed the SDGs, emphasizing the need to assess whether the goals focus on “quantity” or “quality” aspects of sustainability (Mason, Augustyn, and Seakhwa-King 2022). Critics argue that localizing these goals in sustainable tourism is essential for achieving meaningful outcomes (Movono and Hughes 2020). Furthermore, there is criticism of the application of SDG 8 (Decent Work and Growth) in tourism, questioning its effectiveness in promoting inclusive and sustainable economic growth (Bianchi and Man 2020). The SDGs were developed from the Millennium Development Goals to improve environmental awareness without losing socio-economic advances (Sachs 2012). However, the interactions between sustainable tourism practices and the SDGs in the South Caucasus region have not yet been studied. Therefore, this study aims to address this gap by exploring how sustainable tourism in the South Caucasus can effectively contribute to the SDGs, focusing on both quantity and quality aspects of sustainability, providing a comprehensive understanding of how tourism practices can align with broader SDGs.

In this context, there is a research gap needing a comprehensive understanding of the trade-offs and synergies in sustainable tourism within mountain ecosystems (Bagirov 2021). Existing

literature often addresses these challenges separately, lacking a holistic examination that recognizes the interplay between these complexities. For instance, a recent review (Ralph and Arora 2024) on SDG 8 highlighted the presence of the tourism topic connecting with decent work (Robinson et al. 2019), but the topic appeared in only a handful of publications and journals, despite being one main target of SDG 8 (target 8.9).

The main question of this study is to understand how sustainable tourism in the South Caucasus region relates to the SDGs. The importance of this research is in its potential to shed light on the multidimensional nature of sustainable tourism in mountain ecosystems and provide practical insights for stakeholders. In line with this aim, this study seeks to contribute to the field of sustainable tourism and SDG research by offering a literature review that explores both the broader context of sustainable tourism and its specific applications in the South Caucasus region. By mapping potential synergies and trade-offs between sustainable tourism practices and SDG targets, we attempt to provide an overview of research trends, themes, and challenges across Armenia, Azerbaijan, and Georgia. These findings aim to offer insights for policymakers and stakeholders considering the alignment of regional tourism development with SDG achievement. Additionally, through our scoping review approach, we intend to highlight areas that may benefit from further investigation, thus potentially paving the way for future research on sustainable tourism development in the unique context of the South Caucasus.

This paper is structured as follows: Section 2 provides a background on sustainable tourism and the SDGs, with a focus on the South Caucasus context. Section 3 outlines the methodology, including the scoping review process and SDG mapping approach. Section 4 presents the results, highlighting key findings on sustainable tourism practices and their alignment with SDGs in the region. Section 5 discusses the implications of these findings, addressing challenges and opportunities for sustainable tourism development. Finally, Section 6 concludes the paper, summarizing key insights and suggesting directions for future research.

2 | Background

2.1 | Sustainable Tourism and the SDGs

Sustainable tourism is a multifaceted concept encompassing the preservation of natural and cultural resources while promoting positive economic, social, and environmental impacts (Streimikiene et al. 2021). The UN World Tourism Organization (UNWTO) and UN Environment Program (UNEP) define it as “tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities” (UNEP and UNWTO 2005). This definition aligns with the UNWTO's advocacy for a tourism model that considers long-term positive impacts on financial, social, and environmental aspects (Suyono and Nugraha 2024). This definition applies across diverse tourism types and destinations, including both mass tourism and niche segments. Sustainable tourism is founded on three pillars: environmental, economic, and socio-cultural

sustainability (Punzo et al. 2022). It aims to efficiently utilize environmental resources while preserving ecological processes and biodiversity; respect the socio-cultural authenticity of host communities, safeguarding their cultural heritage and values; and ensure viable, long-term economic operations that provide equitably distributed socio-economic benefits to all stakeholders (Budeanu et al. 2016).

The alignment between sustainable tourism and the United Nations' SDGs demonstrates potential synergies between global sustainability aspirations and the tourism industry's capacity to contribute to these objectives. The SDGs, adopted in 2015 as part of the 2030 Agenda for Sustainable Development, provide a comprehensive framework for global progress toward a more equitable, just, and sustainable world. Initially proposed as a policy implementation guide, the SDGs have evolved into a subject of scientific inquiry and a tool for policy evaluation (Sweileh 2020).

While the SDGs provide a framework for sustainable development, they are subject to critique, particularly in their application to tourism. Scholars emphasize the need to assess whether the goals focus on "quantity" or "quality" aspects of sustainability (Mason, Augustyn, and Seakhoa-King 2022). Critics question the effectiveness of applying certain SDGs, such as SDG 8 (Decent Work and Economic Growth), to the tourism sector, raising concerns about the industry's ability to promote inclusive and sustainable economic growth (Bianchi and Man 2020).

The tourism sector contributes to the advancement of several SDGs, with explicit references to three specific targets: 8.9, 12.b, and 14.7. These targets highlight the sector's potential for job creation, promotion of local culture, responsible consumption and production, and sustainable utilization of marine resources (Romeo et al. 2021). However, it is important to note that progress toward these targets can be influenced by global challenges, particularly the triple planetary crisis of climate change, biodiversity loss, and pollution.

Considering these challenges, sustainable tourism's impact extends beyond its explicitly mentioned targets, reflecting a broader trend of cross-sector contributions to the SDGs. For instance, tourism contributes to infrastructure development (SDG 9) through the creation and maintenance of facilities, while also supporting policy coherence (SDG 16) by necessitating coordinated governance approaches in destination management. At the same time, the sector must navigate the complexities of climate change mitigation and adaptation (SDG 13), biodiversity conservation (SDG 15), and waste management (SDG 12) to ensure its long-term sustainability and positive contribution to the SDGs.

In this context, technology plays a crucial role in advancing sustainable tourism and supporting SDG achievement. Digitalization is improving resource management and enhancing visitor experiences in tourism (Rodrigues, Eusébio, and Breda 2022), while also contributing to various sectors related to the SDGs. Varriale et al. (2024) highlight how different technologies contribute to specific SDGs: Artificial intelligence supports clean energy (SDG 7) and climate action (SDG 13), while

geospatial technologies in agriculture address hunger (SDG 2) and water management (SDG 6), which can further improve and expand the nexus on SDGs, tourism, and infrastructure-related. Within the tourism sector, technological innovations are supporting sustainability goals through various means. Blockchain technology is enhancing transparency in tourism operations (Erol et al. 2022), while AI and digital supply chain innovations are improving sustainability performance in tourism SMEs, particularly relevant in the postpandemic recovery (Wang and Zhang 2024). These technological advancements, applied across sectors, provide tools for realigning tourism development with a wider range of SDGs, offering pathways to revitalize the sector's potential in the face of recent challenges (Ilieva and Todorova 2023).

This cross-sector approach underscores the interconnected nature of sustainable development efforts and highlights tourism's role within the broader landscape of SDG achievement. Recent global events, particularly the COVID-19 pandemic, have significantly impacted progress toward these targets. The United Nations' SDG Report 2023 indicates that the tourism industry's share in global gross domestic product (GDP) decreased significantly in 2020 compared to prepandemic levels (United Nations 2023).

The implementation of SDGs in specific contexts, such as sustainable tourism, presents challenges. Scholars stress the importance of localizing the SDG agenda to achieve meaningful outcomes, a process that requires critical thinking to explore how tourism can effectively contribute to the SDGs beyond current conversations (Movono and Hughes 2020). Challenges in this process include addressing issues such as poor salaries, working conditions, high turnover rates, and gender equity concerns within the hospitality sector (Dube 2021).

2.2 | South Caucasus Context

2.2.1 | Mountain Sustainable Tourism

Sustainable tourism in the South Caucasus mountains presents a complex interplay of environmental, social, and economic factors. This unique geographical area, encompassing Armenia, Azerbaijan, and Georgia, is characterized by rich biodiversity, traditional communities, and diverse cultural heritage within fragile mountain ecosystems. As these countries increasingly turn to tourism for economic development, the need for sustainable practices becomes paramount. Recent research in Armenia's Dilijan National Park demonstrates this intersection between ecological preservation and socio-economic goals, revealing significant potential for cultural ecosystem services in areas where touristic infrastructure meets natural river catchments (Asatryan et al. 2024). This example underscores the importance of integrating sustainable development principles to protect the region's delicate ecological balance while fostering economic growth.

Effective governance and stakeholder involvement are crucial components of sustainable tourism development in the South Caucasus. Studies in Armenia emphasize the importance of identifying and involving all stakeholders, evaluating tourism's

role in regional development, and finding innovative solutions for sustainable practices across various regions (Tovmasyan and Gevorgyan 2024). These strategies are essential for fostering cooperation between local communities and tourism enterprises, aligning with United Nations SDGs. The economic potential of sustainable mountain tourism in the region is significant, offering direct income and employment opportunities for rural communities. Georgia provides a compelling example, where tourism development in mountainous areas has shown great potential for economic revitalization, transforming poor rural settlements and elevating living standards (Bakhtadze et al. 2024). However, balancing these economic benefits with environmental and social sustainability remains a persistent challenge.

Addressing these issues requires a multifaceted approach, including developing policy frameworks, promoting sustainable practices, and fostering entrepreneurship within an innovative economy context. Research in Armenia has proposed new tools for evaluating sustainable tourism development goals and measuring the implementation of solutions across different sectors (Mkrtchyan, Tovmasyan, and Dallakyan 2023). As the South Caucasus continues to develop its mountain tourism sector, it must navigate the delicate balance between economic growth, environmental conservation, and cultural preservation. Studies recommend elaborating comprehensive sustainable tourism development plans, improving infrastructure, and expanding touristic routes based on existing regional resources (Tovmasyan and Gevorgyan 2024). These strategies aim to ensure that the growth of mountain tourism in the South Caucasus not only drives economic development but also preserves the unique natural and cultural heritage that makes the region an attractive destination.

2.2.2 | Environment

Developing tourism infrastructure while preserving the ecology is challenging in the South Caucasus region. Building roads, accommodations, and facilities can harm habitats, cause deforestation, and lead to soil erosion (Hernández-Delgado et al. 2012). Planning, sustainable construction methods, and following environmental regulations can help reduce ecological impact while meeting infrastructure needs (Feio and Guedes 2013). One key framework guiding sustainable tourism in the Caucasus is the UNESCO Education for Sustainable Development (ESD) framework, which emphasizes transdisciplinary approaches engaging both academic institutions and local communities (Keryan et al. 2020).

Reducing the carbon footprint of energy consumption is important for sustainable tourism. Tourism often uses significant energy resources, contributing to greenhouse gas emissions (Kuldasheva et al. 2023). Solutions include promoting energy-efficient practices, using renewable energy sources, and encouraging sustainable transportation (Gössling and Schumacher 2010). Additionally, the impact of climate change on water resources poses a significant threat to tourism sustainability, particularly in Azerbaijan, where water scarcity is becoming a pressing issue (Aliyev and Suleymanov 2023). Focusing on energy efficiency supports tourism growth and carbon reduction goals (Gössling, Scott, and Hall 2013).

2.2.3 | Economy and Community

Increased tourism revenue risks eroding local cultures. More tourists can commodify culture, dilute traditions, and affect authenticity (Debarbieux et al. 2014). Sustainable tourism practices help balance revenue growth and cultural preservation (Chan 2023). The preservation of historical heritage sites is vital for attracting tourists and fostering economic growth. A strategic approach to creating tourism clusters around these sites can enhance job creation and economic stability while ensuring the protection of cultural assets (Shirokalova et al. 2023). Promoting cultural exchange, respecting local customs, and involving communities in decision-making can protect culture while supporting economic growth (Li and Hunter 2015).

Balancing local livelihoods and environmental protection is challenging. Tourism opportunities can conflict with conservation efforts, potentially leading to unsustainable resource use (Samal and Dash 2023) or being a driver for the displacement of vulnerable populations (Harris-Brandts and Sichinava 2021). Community-based tourism initiatives can empower local communities economically while promoting environmental stewardship (Zielinski et al. 2020). This approach aligns economic growth with conservation (Imbaya et al. 2019). Tourism has been a significant driver of economic growth in the South Caucasus region. For instance, in Azerbaijan, the multiplier effect of tourism has benefited various sectors beyond hospitality and travel (Musayeva and Silineviča 2016). However, challenges remain, particularly in attracting sufficient foreign investment to fully realize the potential of tourism offerings (Hajaliyev 2023).

2.2.4 | Post-COVID Tourism Trends and Niche Markets

The COVID-19 pandemic has necessitated a reevaluation of tourism strategies in the South Caucasus (Bakirli 2024). In Georgia, there has been a shift in tourist demographics and preferences, with a notable increase in domestic tourism and a gradual recovery of international visitors. The MICE (meetings, incentives, conferences, and exhibitions) sector has shown resilience, with only a 9% decrease in arrivals from EU countries in 2022 compared to 2019 (Bokeria 2023). Governments in the region have actively promoted various forms of tourism, including ecotourism, wine tourism, and cultural heritage tourism, capitalizing on their rich historical and natural resources (Gogitidze et al. 2022; Sekhniashvili 2020a, 2020b). Armenia, while often overshadowed by its neighbors, has potential for growth in niche markets such as religious tourism and ecotourism, which align with global travel trends (Metreveli, Kokhia, and Merabishvili 2018). Adjusting tourism marketing and enhancing authenticity is important for the South Caucasus (Pomeroy, Noble, and Johnson 2011). Poorly targeted marketing can attract large numbers of tourists to specific sites, resulting in overcrowding and degradation of cultural and natural resources. For instance, popular destinations like Yerevan, Tbilisi, and Baku may experience overwhelming visitor numbers that strain local infrastructure and diminish the quality of the tourist experience. Marketing that focuses on natural beauty, culture, and sustainable practices can attract mindful visitors, preserving authenticity and avoiding overcommercialization (Jashi 2018). The importance of trust in government and effective communication

has been highlighted as crucial for fostering positive perceptions of tourism among residents (Woosnam et al. 2021).

3 | Methods

3.1 | Review Design and Research Question

This scoping literature review (Tricco et al. 2016) followed PRISMA guidelines and incorporated an SDGs mapping methodology (Fuso Nerini et al. 2018; Parikh et al. 2020; Martins et al. 2024). The complete review protocol, including search strategies and selection criteria, can be found in Supporting Information S1. To structure our research question and search strategy, we adapted the PICO framework (Schiavenato and Chu 2021):

- P (Population/Problem): Tourism industry and practices in the South Caucasus region
- I (Intervention/Issue): Sustainable tourism initiatives and practices
- C (Comparison): Not applicable in this case
- O (Outcome): Alignment with SDGs

Our guiding research question, adapted to the PICO framework, was: “How do sustainable tourism practices in the South Caucasus region (P) align with and contribute to (I) the SDGs (O)?” Secondary research questions are presented in Table 1.

3.2 | Search Strategy, Eligibility Criteria, and Study Selection

We conducted our literature search in Scopus and Web of Science (WoS) databases. Our search strategy utilized two main keyword strings:

1. *Tourism-related keyword string (Intervention/Issue and Outcome):* (“tourism” OR “travel” OR “hospitality” OR “tourist attractions” OR “destination management” OR “sustainable tourism” OR “cultural tourism” OR “ecotourism” OR “adventure tourism” OR “Mountain Tourism” OR “heritage tourism” OR “community-based tourism” OR “tourism policies” OR “tourism development” OR “tourism impacts” OR “tourism planning” OR “tourism marketing” OR “tourism experiences” OR “tourism trends” OR “tourism economy” OR “tourism governance”)

2. *Geographical limit keyword string (Population/Problem):* (“Caucasus” OR “Caucasian region” OR “South Caucasus” OR “Caucasus countries” OR “Armenia” OR “Azerbaijan” OR “Georgia” OR “Caucasus tourism” OR “Caucasus destinations” OR “Caucasus culture” OR “Caucasus heritage” OR “Caucasus landscapes” OR “Caucasus travel” OR “Caucasus hospitality”)

We used these search terms in the title, abstract, and keywords fields. We limited our search to English-language journal articles. We conducted our literature search in Scopus and WoS databases. As illustrated in Figure 1, we used the search terms “SDGs,” “Caucasus,” and “sustainable tourism” in the title, abstract, and keywords fields. We limited our search to English-language journal articles. The initial search yielded 3809 records from Scopus and 872 records from WoS, totaling 4681 records. After applying the exclusion (EC) and inclusion (IC) criteria, 94 documents were selected for full-text review.

3.3 | Data Extraction, Appraisal, and Synthesis

The review encompassed studies from all disciplines up to August 2023, employing an SDGs mapping methodology to analyze synergies and trade-offs (Martins et al. 2024; Diep et al. 2021; Parikh et al. 2020; Fuso Nerini et al. 2018; Vinuesa et al. 2020). A panel of three experts independently rated each study’s alignment with the SDGs, indicating specific targets and providing reasoning for identified synergies and trade-offs. To mitigate bias, each article was analyzed by two reviewers, with five researchers rotating roles in the categorization and validation process. Consensus was reached through discussion, or the median rating was used if agreement could not be achieved. An example of the categorization process is provided in Supporting Information S2: Appendix II.

3.4 | PRISMA Overview

Figure 1 serves as the PRISMA flow diagram, showing the number of studies identified, screened, assessed for eligibility, and included in the review, with reasons for ECs at each stage. The database search yielded 3809 records from Scopus and 872 from WoS. After applying EC and IC criteria, 93 studies were included in the final analysis. These studies were then categorized and analyzed for SDG Synergies and Trade-offs, as shown in the final step of Figure 1.

TABLE 1 | Secondary research questions.

Research question	Items covered	Data extraction item
RQ1. What are the main findings on sustainable tourism in the South Caucasus region?	Geographic focus Methodological approaches Key themes and topics	Research methodology Research aim Geographic focus Theoretical framework Findings overview
RQ2. How does sustainable tourism in the South Caucasus align with the UN Sustainable Development Goals (SDGs)?	Overview of synergies Overview of trade-offs Most relevant SDG targets	SDG synergies and trade-offs Reasoning for synergy Reasoning for trade-off

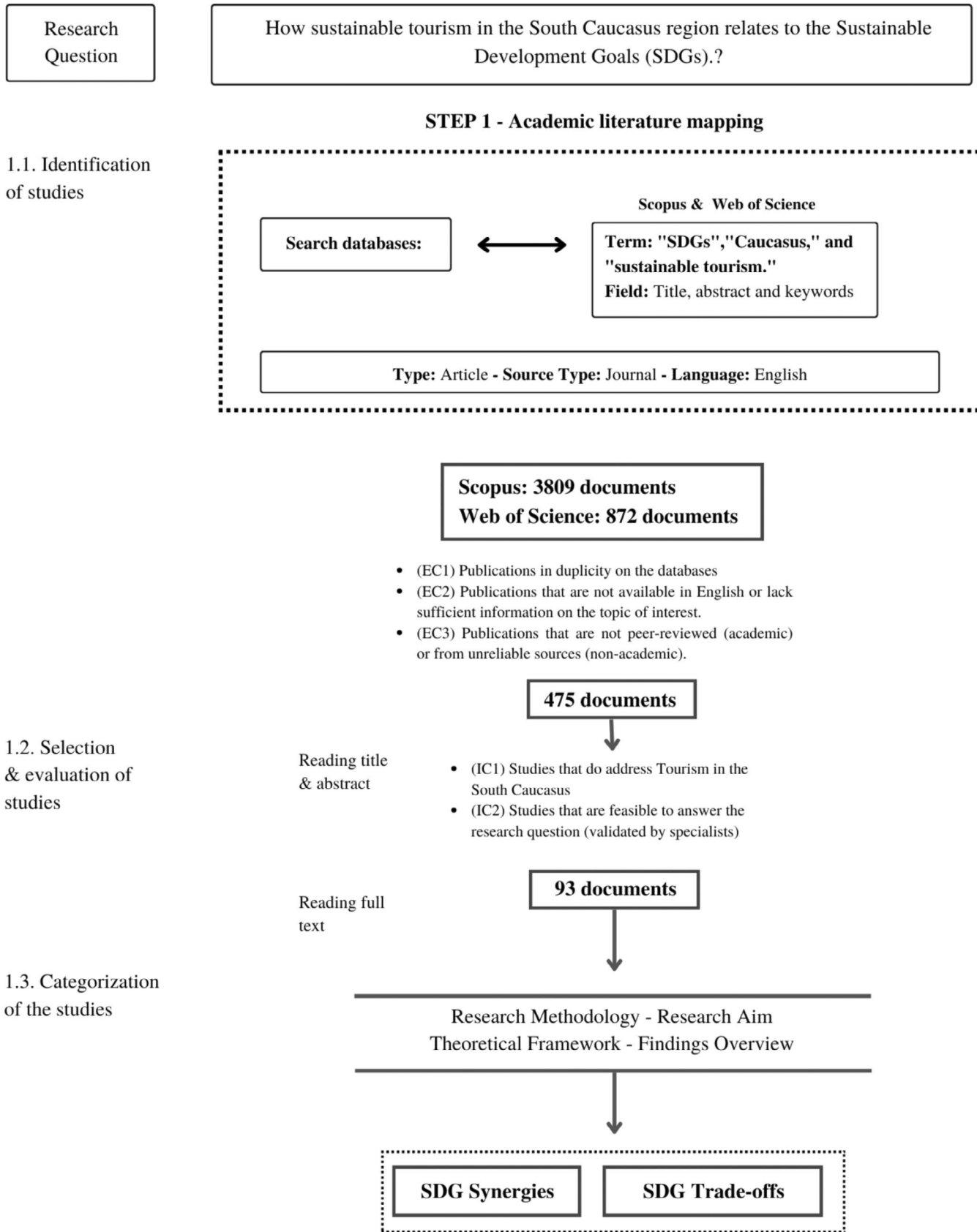


FIGURE 1 | Research Flow. *Source:* Elaborated by authors.

4 | Results

4.1 | Overview

In this section, we provide an in-depth overview of the findings from an analysis of 94 academic papers on sustainable tourism in the South Caucasus. Results are organized by: Methodologies and Theoretical Frameworks, Main Findings Across the Topics, and Geographic Focus. In the second phase of the results presentation, the connections between published evidence and the SDGs are shown. An in-depth analysis of the overall linkages with the 17 SDGs is conducted, followed by a mapping of the 169 specific targets*, the most recurrent and the overall presence in sustainable tourism.

4.2 | Main Findings

This section aims to answer the RQ1 “What are the main findings on sustainable tourism in the South Caucasus region?” by presenting the key methodologies, theoretical frameworks, and key themes and topics in sustainable tourism research in the South Caucasus region.

4.2.1 | Methodologies and Theoretical Frameworks

The research papers employ diverse methodologies and theoretical frameworks, demonstrating various approaches to studying tourism in the South Caucasus. Methodologies range from case studies (Malkinson et al. 2018) and structural equation modeling (Heiny et al. 2019) to comparative analysis (Tevzadze and Kikvidze 2016) and mixed-methods approaches (Schmid, Gugushvili, and Kohler 2022). Qualitative methods such as document analysis and interviews (Khartishvili et al. 2019) are also utilized.

Theoretical frameworks include the Theory of Planned Behavior, Socio-ecological systems, Grounded Theory, Community-based tourism, SWOT analysis, Analytic Hierarchy Process (AHP), and Archetype Analysis. These frameworks are applied to examine various topics, including tourism's impact on livelihoods, economic development, sustainability, and cultural identity. For instance, Heiny et al. (2019) use the Theory of Planned Behavior to study households' intentions to enhance tourism, while Gugushvili and Salukvadze, and Salukvadze (2019) apply Grounded Theory. Liu and Suk (2021) employ SWOT and AHP methods to assess sustainable tourism strategies.

4.2.2 | Key Topics

Tourism development in the South Caucasus region encompasses a complex array of interconnected themes, reflecting the multifaceted nature of the industry. Table 2 synthesizes nine distinct tourism focus areas, ranging from cultural heritage to gastronomic tourism, illustrating the diverse aspects of tourism development in the region. It highlights the primary themes within each area, their alignment with specific SDGs, and the synergies and trade-offs between tourism practices and SDG targets. Economic significance emerges as a primary focus, with studies

by Mikayilov et al. (2020) and Tovmasyan (2023) highlighting tourism's crucial role in GDP growth and employment generation. Complementing this, Israfilova and Khoo-Lattimore (2018) emphasize the importance of sustainability in tourism practices and cultural heritage preservation. The industry faces significant challenges, including the COVID-19 pandemic, terrorism threats, and political instability, prompting researchers such as Gogsadze et al. (2022) to propose innovative solutions like tourism clusters. Cultural heritage (Kazanjian 2018), rural tourism (Khartishvili et al. 2019), socio-economic impacts (Salukvadze and Backhaus 2020), ecological considerations (Tevzadze and Kikvidze 2016), and specific regional developments (Aliyev and Ahmadova 2020) are among the key themes explored in the literature, underscoring the complexity and interconnectedness of tourism development in the South Caucasus.

4.3 | Alignment With SDGs

This section addresses the second research question “How does sustainable tourism in the South Caucasus align with the UN SDGs?” by analyzing the connections between sustainable tourism practices in the South Caucasus and the SDGs, including synergies and trade-offs.

4.3.1 | SDGs Targets Coverage

Further analysis of linkages identifies synergies and trade-offs between the published evidence and the 169 targets of the SDGs. Figure 2, based on the work of Vinuesa et al. (2020), shows all targets mentioned at least once in the collected evidence, indicating Agenda 2030's coverage in the published literature. The analysis found evidence of synergies for 66 targets and trade-offs for 52 targets out of the 169 total targets.

The study analyzed 93 academic papers related to sustainable tourism in the South Caucasus region, categorizing them according to the 169 specific SDG targets. This analysis identified 434 connections, including 158 trade-offs and 276 synergies. A single study often showed multiple linkages. Figure 3 shows the distribution of these connections among the 17 SDGs. SDG 1, “No Poverty,” had 24 synergies and 10 trade-offs, indicating complex interactions. SDG 8, “Decent Work and Economic Growth,” had 61 synergies and 34 trade-offs, suggesting a need for balance. SDG 11, “Sustainable Cities and Communities,” showed 37 synergies and 23 trade-offs, reflecting the nature of urban development. SDG 17, “Partnerships for the Goals,” had no identified trade-offs, possibly indicating that collaborative partnerships may avoid direct hindrances to other SDGs. However, this does not imply an absence of challenges in achieving Goal 17. These findings provide a perspective on SDG interactions, highlighting the need for a holistic and integrated approach to address global challenges.

4.3.2 | Synergies Between Sustainable Tourism and SDGs

4.3.2.1 | Economic Development (SDG 8). Sustainable tourism shows synergies with economic development, particularly in relation to **SDG 8** (Decent Work and Economic Growth).

TABLE 2 | Overview of sustainable tourism focus areas in the South Caucasus and their SDG alignments.

Tourism focus area	Key themes	Primary SDG alignment	Linkage tourism-SDG	Example references
Cultural heritage tourism	Cultural preservation, Diaspora tourism, Religious heritage	SDG 11 (Sustainable Cities and Communities)	Synergy: Preservation of cultural sites contributes to sustainable urban development (31 synergies with SDG 11.4) Trade-off: Potential overexploitation of cultural sites due to increased tourism	Fernandes (2011); Metreveli and Timothy (2010)
Economic development	GDP growth, Employment generation, Tourism-led growth	SDG 8 (Decent Work and Economic Growth)	Synergy: Tourism as a driver of economic growth and job creation (49 synergies with SDG 8.9) Trade-off: Potential economic dependence on tourism sector	Aliyev and Ahmadova (2020); Tovmasyan (2023)
Sustainable practices	Environmental conservation, Resource management, Ecotourism	SDG 15 (Life on Land)	Synergy: Promotion of environmental awareness and conservation efforts Trade-off: Balancing tourism development with ecosystem conservation (18 trade-offs with SDG 15.1)	Armenakyan and Brown (2019); Ghorbanzadeh et al. (2019)
Urban tourism	Mega-events, Urban sustainability, City branding	SDG 11 (Sustainable Cities and Communities)	Synergy: Positive impacts on urban sustainability and infrastructure development Trade-off: Challenges in balancing development and preservation of urban spaces	Mirzayeva et al. (2020a, 2020b); Huseynli (2023)
Rural tourism	Livelihood transformation, Guesthouse tourism, Community-based tourism	SDG 1 (No Poverty)	Synergy: Additional income opportunities in rural areas Trade-off: Potential disruption of traditional livelihoods and local cultures	Khartishvili et al. (2019); Salukvadze, Gugushvili, and Salukvadze (2019)
International initiatives	Belt and Road Initiative, Cross-border cooperation	SDG 17 (Partnerships for the Goals)	Synergy: Facilitating transnational corridor development and economic growth Trade-off: Potential for uneven development and resource allocation	Schuhbert and Thees (2020); Pechlaner et al. (2021)
Health and wellness tourism	Medical tourism, Spa tourism	SDG 3 (Good Health and Well-being)	Synergy: Promoting health and well-being through specialized tourism services Trade-off: Potential strain on local healthcare resources	Verulava and Jorbenadze (2018); Mantel (2013)
Technological integration	Digital technology in tourism, GIS for tourism planning	SDG 9 (Industry, Innovation, and Infrastructure)	Synergy: Enhancing tourism services and planning through technological innovations Trade-off: Potential digital divide and unequal access to technology	Rehman et al. (2022); Ghorbanzadeh et al. (2019)
Gastronomic tourism	Local cuisine, wine tourism	SDG 2 (Zero Hunger) and SDG 8 (Decent Work and Economic Growth)	Synergy: Promoting local food production and cultural preservation through tourism Trade-off: Possible commodification of local food cultures	Aliyev (2022); Sekhniashvili (2020a, 2020b)

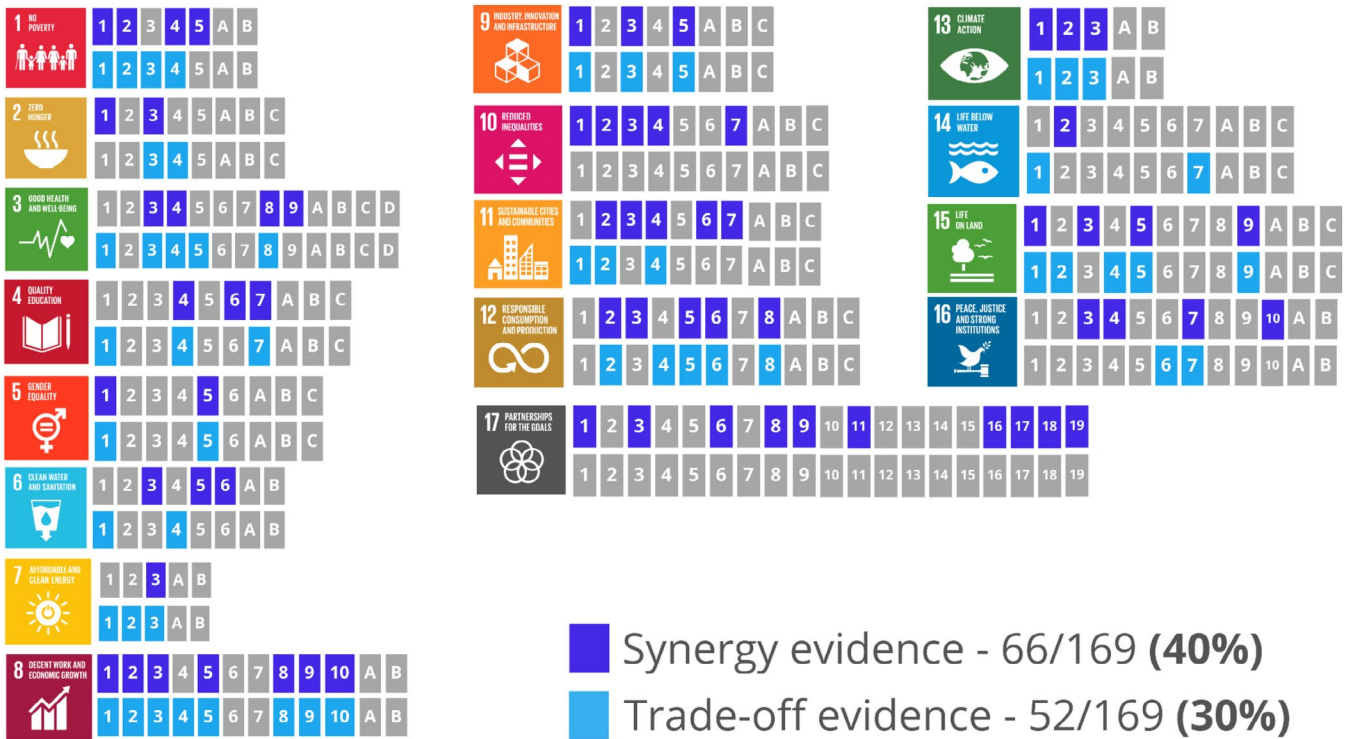


FIGURE 2 | SDGs target coverage. *Source:* Elaborate by authors, visualization informed by works of Vinuesa et al. (2020)

Target 8.9 addresses policies promoting sustainable tourism that creates jobs and showcases local culture and products. Research across various regions supports this connection. For example, studies in Azerbaijan indicate the importance of collaboration in achieving tourism-driven economic growth (Gandilova 2020), which relates to regional and global partnerships, related in the **SDG 17** targets, while also highlights the impact on GDP by the tourism sector of these countries, driven by job creation and infrastructure improvement (**target 9.1**). Research in Armenia also shows tourism’s potential to contribute to regional development, increase employment (**target 8.3**), and reduce poverty (**target 1.1**) (Tovmasyan and Gevorgyan 2024).

Infrastructure is a key factor in sustainable tourism development according to several studies. Research in the Gusar region of Azerbaijan links the mitigation of tourism seasonality with improvements in road and transport infrastructure (**target 9.1**) (Vahid 2023). At a broader level, the Belt and Road Initiative (BRI) (**SDG 17**) demonstrates how increased economic activity and improved transportation networks can help reduce poverty and improve access to resources (Pechlaner et al. 2021). These infrastructural improvements support both tourism and broader economic development goals. Additionally, the link between sustainable tourism and economic development is reflected in new approaches to policy evaluation (**target 17.14**), with recent studies introducing tools to assess the implementation of sustainable tourism initiatives across various sectors (Mkrtchyan, Tovmasyan, and Dallakyan 2023). These new evaluation methods indicate ongoing developments in approaches to sustainable tourism development and its economic impacts.

4.3.2.2 | Cultural Heritage and Sustainable Cities (SDG 11). Sustainable tourism presents significant synergies with **SDG 11** (Sustainable Cities and Communities), as it promotes

cultural preservation alongside economic growth. Imrani et al. (2023) highlight the value of cave preservation in Azerbaijan, aligning with **target 11.4** (protect and safeguard cultural and natural heritage) and illustrating how heritage conservation can support job creation through speleotourism (**target 8.9**). Similarly, Rafiq and Arshad (2022) emphasize the preservation of architectural and archaeological heritage in mountainous areas, advocating for cultural tourism routes that promote local development and educational activities, which align with **SDG 4.4** (Quality Education) and **SDG 8.9**.

Huseynli’s (2023) study on branding Shusha as a cultural destination further illustrates the importance of cultural heritage in fostering economic growth under **SDG 11**, supporting **SDG 8** through tourism. While this branding enhances urban infrastructure (**SDG 9**), it also raises concerns about biodiversity impacts (**SDG 15**). Lastly, Snake-Beings (2021) explores sustainable tourism’s impact on preserving cultural authenticity (**SDG 11.6**) and supports **SDG 12.8** by encouraging culturally respectful tourism. Collectively, these studies demonstrate how sustainable tourism can help achieve **SDG 11** by integrating cultural preservation with economic and social development, while also advancing related goals like **SDG 8**, **SDG 9**, and **SDG 4.4**.

4.3.2.3 | Health and Well-Being (SDG 3). The COVID-19 pandemic’s impact on Georgia’s tourism sector intersects with several SDGs, primarily connecting with the prevention of communicable diseases, **target 3.3** (end epidemics of AIDS, tuberculosis, malaria, and other communicable diseases). Health and well-being issues that overlap with tourism, such as spa tourism, are examined in various papers. Mantel’s study highlights the economic, **target 8.9**, and wellness, **target 3.4** (reduce premature mortality from noncommunicable diseases and promote mental health and well-being) aspects

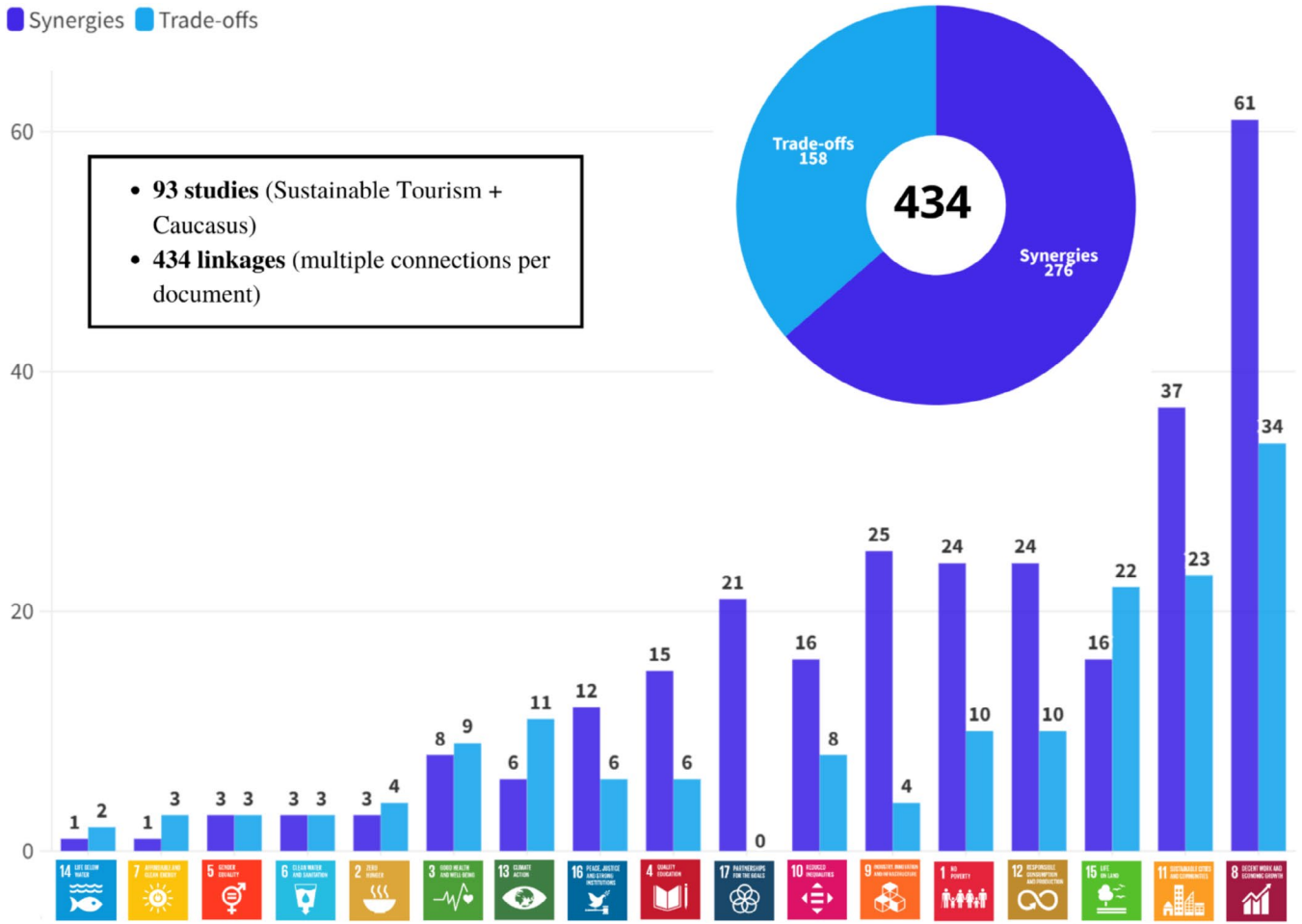


FIGURE 3 | SDG Synergies and Trade-offs in Caucasus Tourism. *Source:* Elaborated by authors.

of spa tourism, emphasizing its potential to drive economic growth while promoting infrastructure and innovation within spa complexes.

4.3.2.4 | Poverty Alleviation and Inclusive Communities (SDGs 1 and 10). Sustainable tourism serves as a means to alleviate poverty, **targets 1.2 and 1.5** (reduce the proportion of people living in poverty and build the resilience of the poor and vulnerable), and nurtures inclusive communities, **target 11.3** (enhance inclusive and sustainable urbanization). Heiny et al.'s study (2019) investigates factors influencing rural households' intentions to enhance tourism activities, offering insights into reducing poverty through additional income opportunities in tourism. The connection between guesthouses and poverty alleviation is recurrent in other papers (Gugushvili, Salukvadze, and Salukvadze 2019; Schmid, Gugushvili, and Kohler 2022).

4.3.2.5 | Environmental Conservation (SDGs 6, 12, 13, 15). Sustainable tourism in rural areas helps preserve unique ecosystems and cultural heritage, **target 11.4**, and plays a role in safeguarding endangered species, **target 15.4** (conservation of mountain ecosystems and their biodiversity). This approach aligns with several SDGs beyond environmental conservation. It supports SDG 6, particularly **target 6.5** (integrated water resources management), by promoting integrated water

resources management in the context of sustainable tourism. Additionally, it indirectly contributes to SDG 12, specifically **target 12.2** (sustainable management and efficient use of natural resources), by advocating for responsible consumption and production practices in the hotel industry. Furthermore, addressing water scarcity concerns can enhance climate resilience, **target 13.1** (strengthen resilience to climate-related hazards and natural disasters), and promote ecosystem preservation, **target 15.1** (conservation, restoration, and sustainable use of terrestrial and freshwater ecosystems) (Aliyev and Suleymanov 2023).

4.3.3 | Trade-Offs and Challenges

4.3.3.1 | Environmental Concerns. Sustainable tourism in the South Caucasus introduces several environmental challenges and trade-offs. Tourism can disrupt habitats, potentially conflicting with biodiversity conservation, **target 15.1** (conservation, restoration, and sustainable use of terrestrial and freshwater ecosystems) (Gogitidze et al. 2022). This conflict highlights the delicate balance between promoting tourism and preserving natural ecosystems. The growing tourism sector's increased water demand, particularly in the hotel industry, could conflict with water quality and access and impose trade-offs with other industries, such as agriculture, **target 6.4** (increase water-use efficiency and sustainable freshwater withdrawals) (Putkaradze

and Abuselidze 2019). For example, a study on water resource protection in Azerbaijan's sustainable tourism sector reveals that the overlapping challenges of tourism industry growth, climate change, and urbanization may lead to water depletion (Aliyev and Suleymanov 2023). The exacerbation of water scarcity due to climate change may hinder progress toward climate resilience, **target 13.1** (strengthen resilience to climate-related hazards and natural disasters). These environmental trade-offs underscore the need for careful management of tourism development to ensure it does not compromise the region's ecological integrity.

4.3.3.2 | Socio-economic Challenges. The development of sustainable tourism in the South Caucasus presents both challenges and opportunities. Gender disparities in guesthouse management challenge gender equality (**target 5.5**), highlighting the need for more inclusive practices in the tourism sector. Unemployment and seasonal work are significant concerns, relating to **target 8.5** (full employment and decent work). Putkaradze and Abuselidze (2019) propose strategies for addressing seasonal unemployment in Ajara, Georgia, through rational nature management and business adjustments (**target 12.4**). Bakhtadze et al. (2024) demonstrate how tourism development in Georgia's mountainous regions has increased living standards, transforming rural settlements and stimulating local economic activities (**target 8.3**).

The socio-economic challenges of sustainable tourism in the South Caucasus are further contextualized by Shatberashvili et al. (2024), who highlight the unique features of the Caucasus ecoregion spanning six countries. They emphasize the need for regional collaboration in addressing cross-border socio-ecological challenges. The efforts of the Scientific Network for the Caucasus Mountain Region (SNC-mt) and Sustainable Caucasus in fostering regional cooperation align with **target 17.16** (enhance global partnership for sustainable development). Their work on regional research agendas and environmental outlooks provides a framework for coordinated action, potentially benefiting sustainable tourism development across the region.

4.3.3.3 | Long-Term Versus Short-Term Impacts. A critical trade-off highlighted in the research is the tension between short-term economic gains and long-term sustainable development. This is often referred to as the “resource curse” concept. Aliyev and Ahmadova (2020) address this as the “resource curse in the long-term,” particularly when discussing Georgia. The research suggests a potential trade-off between the short-term and long-term impacts of tourism on economic growth, which relate to **target 8.1** (sustain per capita economic growth) and **target 8.10** (strengthen capacity of domestic financial institutions). The short-term positive impact might boost economic growth initially, but the long-term negative effects, including crowding out human capital from other sectors, raise concerns about the sustainability of this growth strategy.

Arnegger and Herz (2016) also explore this trade-off, as seen in their analysis of the 2012 Eurovision Song Contest in Baku. While the event generated immediate economic benefits, such as job creation and income (**supporting SDG target 8.9**), the resource-intensive nature of mega-events can lead to

unsustainable practices in the long run. This concept of the “resource curse” suggests that an abundance of natural resources (in this case, tourism attractions) can paradoxically lead to slower economic growth in the long run. This trade-off highlights the need for a balanced approach to tourism development that considers its long-term consequences and seeks to minimize negative impacts.

5 | Discussion

5.1 | SDGs Linkages on Sustainable Tourism Development in the South Caucasus

While the SDG framework offers a comprehensive approach to evaluate the multifaceted impacts of tourism development, its application reveals certain limitations. The potential for trade-offs between different goals presents a significant challenge. For instance, increased tourism can drive economic growth (SDG 8) while simultaneously straining local resources and ecosystems (SDG 15) (Neudert et al. 2019). Furthermore, tourism development might inadvertently exclude local communities or exacerbate socio-economic inequalities, conflicting with SDG 10 (Salukvadze and Backhaus 2020). These trade-offs illustrate that the SDG framework, while valuable, requires careful and context-specific application to ensure that the pursuit of one goal does not undermine others.

The tourism sector in the South Caucasus is undergoing a significant transition, with each country facing unique challenges and opportunities in aligning their tourism development with the SDGs. Table 3 presents an overview of the SDG statuses for Armenia, Azerbaijan, and Georgia, based on the 2024 SDG Index, along with key synergies and trade-offs identified in our literature review.

Armenia, showing progress in poverty reduction (SDG 1—Challenges Remain, improving), can leverage its cultural heritage and natural resources to develop sustainable tourism. This aligns with the most frequent synergies identified in our review: SDG 8.9 (49 counts) for promoting sustainable tourism and SDG 11.4 (31 counts) for protecting cultural heritage. Key strategies include adopting cooperative frameworks like tourism clusters and cross-border synergies, and increasing R&D investment to foster innovation in sustainable tourism (Khartishvili et al. 2019).

Azerbaijan, also showing to be on track for achieving SDG 1 but facing major challenges in responsible consumption (SDG 12) and climate action (SDG 13), can capitalize on its improving status in industry and infrastructure (SDG 9). This connects with our finding of significant synergies with SDG 9.1 (19 counts) for developing sustainable infrastructure. Priorities include leveraging initiatives like the Belt and Road Initiative to enhance transportation networks (SDG 9.1) and balancing economic growth with environmental sustainability, particularly addressing high CO₂ emissions (Aliyev and Suleymanov 2023).

Georgia, showing moderate improvement across most SDGs, particularly in industry and infrastructure (SDG 9), can focus on incorporating digital narratives into its tourism culture

and forming regional alliances. This aligns with the synergies identified for SDG 17 (partnerships for goals). As suggested by Pechlaner et al. (2021), focus areas include implementing stricter regulations in ecologically sensitive areas and developing multistakeholder platforms for dialogue and collaborative decision-making.

Across all three countries, the SDG Index reveals major challenges in responsible consumption and climate action, which aligns with the trade-offs identified in our review, particularly with SDG 15.1 (18 counts) for ecosystem conservation. Balancing economic growth through tourism with environmental and cultural preservation remains crucial. Policymakers should focus on maximizing synergies while mitigating these trade-offs, adopting a holistic approach to enhance their positions in global sustainable tourism while preserving their unique heritage. Participatory approaches are essential for evaluating cultural tourism development in a sustainable manner, ensuring the preservation of local culture while promoting sustainable development. Involving local stakeholders in the decision-making process helps mitigate potential negative impacts on ecosystems and supports the sustainable management of the nature-protected areas in the South Caucasus as highlighted by Asatryan et al. (2024). Capacity-building programs can enhance local skills in sustainable tourism management, addressing potential conflicts between economic growth and sustainability objectives (Sachs et al. 2024).

6 | Conclusions

This study's analysis of 94 papers on sustainable tourism in the South Caucasus revealed a complex network of 434 connections with SDG targets, comprising 276 synergies and 158 trade-offs. The findings underscore the multifaceted nature of sustainable tourism in the region and its potential to significantly contribute to SDGs. Strong synergies identified with SDG 8 (Decent Work and Economic Growth) and SDG 11 (Sustainable Cities and Communities) corroborate existing research on tourism's role in economic development and urban sustainability in the region (Aliyev and Ahmadova 2020; Tovmasyan 2023). These synergies suggest that well-managed tourism can create employment opportunities, stimulate local economies, and contribute to the preservation and development of sustainable urban spaces.

However, the study also revealed significant trade-offs, particularly with environmental SDGs, emphasizing the need for careful management and balanced approaches to tourism development. These findings reflect ongoing concerns about the impact of tourism on natural resources and climate change in the South Caucasus (Aliyev and Suleymanov 2023). The challenge lies in harnessing the economic benefits of tourism while safeguarding the natural and cultural heritage that makes the South Caucasus an attractive destination.

The research highlighted several underexplored areas in the context of sustainable tourism in the South Caucasus, including health tourism, gender equality in tourism employment, and the development of sustainable tourism infrastructure. These gaps align with broader discussions on diversifying tourism

offerings and addressing social equity in the sector (Mantel 2013; Dube 2021).

6.1 | Implications for Policy and Practice

The findings of this study have significant implications for policymakers and tourism stakeholders in the South Caucasus region. They underscore the need for integrated, holistic approaches to tourism development that balance economic growth with environmental conservation and cultural preservation. This section explores how our findings align with and can inform the development strategies of Georgia, Azerbaijan, and Armenia, highlighting the potential for sustainable tourism to contribute to each country's broader economic and social goals.

In Georgia, our findings from the literature align closely with the EBRD's country strategy (EBRD 2021). The emphasis on balancing economic growth with environmental conservation echoes Georgia's aim to improve economic productivity while accelerating the green transition. Our focus on community-based tourism initiatives complements Georgia's priority of promoting equal opportunities and balanced territorial development. The development of region-specific sustainability indicators aligns with Georgia's efforts to improve governance practices. These synergies suggest that sustainable tourism can play a pivotal role in Georgia's development agenda, particularly in the context of ongoing economic reforms and infrastructure investments. Moreover, our findings support the need for cross-sectoral collaboration, as highlighted by Pechlaner et al. (2021), which is crucial for implementing sustainable tourism strategies aligned with the SDGs.

For Azerbaijan, our findings resonate with the "2030: National Priorities for Socio-Economic Development" strategy (Aliyev 2021). The strategy's focus on a competitive economy and green growth aligns with our recommendations for sustainable tourism development. Our emphasis on community-based initiatives corresponds with Azerbaijan's goal of creating an inclusive society and ensuring equitable distribution of development benefits. The strategy's priority of reintegrating liberated territories presents unique opportunities and challenges for sustainable tourism, requiring careful planning to balance economic development with cultural and natural heritage preservation. This aligns with our discussion on the need for careful management of tourism development in sensitive areas, as highlighted by Neudert et al. (2019).

Armenia, a country with limited natural resources and two closed borders, faces significant challenges in its pursuit of economic development, with a focus on tourism as a key driver for job creation. However, the conservation of nature remains a critical concern that must be addressed alongside tourism development to ensure long-term sustainability. In Armenia, our findings complement the "Programme of the Government of the Republic of Armenia (2021-2026)" (Government of the Republic of Armenia 2021). The program's ambitious target of increasing international visitors aligns with our recommendations for balanced tourism growth. Armenia's commitment to environmental protection and sustainable resource management corresponds with our emphasis on environmental

TABLE 3 | SDG status, synergies, and trade-offs in south caucasus tourism development.

SDG	Armenia	Azerbaijan	Georgia	Key synergies	Key trade-offs
1—No Poverty	CR ↑	A ↑	SC →	Targets 1.4 (9), 1.1 (7), 1.2 (7)—Poverty reduction through tourism	—
3—Good Health and Well-being	SC ↗	MC →	SC ↗	Target 3.8 (4)—Balancing health services with tourism development	—
4—Quality Education	SC →	CR →	A →	Target 4.7 (11)—Education for sustainable development	—
8—Decent Work and Economic Growth	SC ↗	MC →	SC →	Target 8.9 (49)—Promoting sustainable tourism	Targets 8.9 (12), 8.8 (6), 8.5 (6)—Balancing growth with labor rights and decent work
9—Industry, Innovation, and Infrastructure	SC ↗	MC ↗	SC ↗	Target 9.1 (19)—Developing sustainable infrastructure	—
10—Reduced Inequalities	CR ↑	A *	SC ↗	Target 10.2 (7)—Ensuring inclusive growth	—
11—Sustainable Cities and Communities	SC →	SC →	CR ↗	Target 11.4 (31)—Protecting cultural heritage	Target 11.4 (19)—Balancing protection with development
12—Responsible Consumption and Production	CR ↗	CR →	CR →	Target 12.8 (12)—Awareness for sustainable development	—
13—Climate Action	CR ↘	SC ↗	CR →	—	Target 13.1 (6)—Climate resilience vs. tourism development
15—Life on Land	MC →	MC →	MC →	Target 15.1 (10)—Ecosystem conservation	Target 15.1 (18)—Ecosystem conservation vs. tourism development
16—Peace, Justice, and Strong Institutions	SC ↗	MC →	SC →	—	Target 16.7 (4)—Ensuring inclusive decision-making

Note: Trends: ↑ = On track or maintaining SDG achievement, ↗ = Moderately improving, → = Stagnating, ↘ = Decreasing. Abbreviations: Status: A, SDG achieved; CR, challenges remain; MC, major challenges; SC, significant challenges.

Source: SDG Country Profiles (Sachs et al. 2024) and research data.

conservation in tourism. Sustainable tourism development plays a crucial role in promoting inclusive economic growth, creating sustainable livelihoods, and supporting the responsible management of ecosystems, as emphasized by the United Nations Sustainable Development Cooperation Framework for Armenia (2021–2025). The focus on cultural heritage preservation, rural development, and digitalization in Armenia's strategy complements our suggestions for diversifying tourism offerings and embracing digital solutions. Furthermore, Armenia's emphasis on regional cooperation and lifting blockades supports our recommendation for increased regional collaboration in tourism development, addressing the challenges of regional distress highlighted in our discussion.

Across all three countries, our findings support the implementation of community-based tourism initiatives, as suggested by recent studies in the region (Schmid, Gugushvili, and Kohler 2022). Investing in sustainable tourism infrastructure and developing region-specific sustainability indicators, as supported by Gandilova (2020), could enable more effective tracking of tourism's impacts on SDG achievement. These approaches can help address the challenges of balancing economic development with environmental and cultural preservation, as discussed in our analysis of trade-offs between different SDGs.

6.2 | Limitations of the Study and Future Research Directions

This study has limitations that should be considered when interpreting its results. The focus on English-language publications may have introduced language bias, potentially overlooking valuable research published in local languages of the South Caucasus region. Furthermore, not all articles are indexed in the Scopus and WoS databases, so we may have missed some relevant studies.

Our focus is on identifying patterns, themes, and research gaps across the included studies, with particular emphasis on the distribution of evidence, sustainable tourism practices, methods employed, and alignment with the SDGs. While we use the terms “synergies” and “trade-offs” to describe interactions between sustainable tourism practices and SDGs, we acknowledge that these concepts are complex and can be interpreted differently across disciplines. Our interpretation aims to capture a broad range of interactions, from mutually reinforcing effects to potential conflicts between different aspects of sustainable development (Moreno et al. 2023; Pradhan et al. 2017). Additionally, the complexity inherent in the concepts of synergies and trade-offs can introduce variability in interpretation. It is important to note that while our study identifies connections between sustainable tourism practices and SDG targets, it does not establish correlation or causality due to the nature of our scoping review methodology and the heterogeneity of the included studies.

Future research should address these limitations and explore underexplored areas in sustainable tourism in the South Caucasus. This could include incorporating non-English publications, employing mixed-method approaches to better understand

synergies and trade-offs, and conducting longitudinal studies to establish causal relationships. Additionally, investigating areas such as health tourism, gender equality in tourism employment, and sustainable tourism infrastructure development could provide valuable insights.

Developing more holistic indicators that capture both socio-economic benefits and ecological impacts of tourism development is crucial, particularly for the Caucasus region. Future studies should focus on context-specific approaches to sustainability that align tourism policies with SDG strategies while respecting local ecological limits. Comparative studies across different linguistic and cultural contexts within the South Caucasus would provide a more comprehensive understanding of sustainable tourism in this diverse region. These efforts would help refine our findings and provide more targeted recommendations for policymakers and tourism stakeholders.

Author Contributions

Flavio Martins: responsible for study conception, main data collection and analysis, primary manuscript writing, and interpretation of results. **Tatiana Sitchinava:** assisted in manuscript review and writing, and contributed to the interpretation of results. **Tigran Keryan:** contributed to study conception, methodology development, data collection, and manuscript review. **Alexander Mitrofanenko:** assisted in manuscript review and writing, and contributed to the interpretation of results. **Nelson Stefanelli:** provided critical reviews, assisted in manuscript writing, and contributed to the interpretation of results. **Yaniss Guigoz:** study conception, project coordination, interpretation of results, and critical review. All authors contributed to manuscript reviews and writing. Each author's distinct contributions have been integral to the development and completion of the paper.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.