

SACRED JOURNEY TO SHRI AMARNATH JI: A MULTIDIMENSIONAL PERSPECTIVE ON GREEN YATRA AND ACTION-DRIVEN ECOLOGICAL RESTORATION

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ABSTRACT

The Shri Amarnath Ji Yatra is among the most significant high altitude pilgrimage routes in the Kashmir Himalaya passing through sensitive ecosystems such as glacial streams, alpine and sub-alpine vegetation. They comprise many species of plants, which are also of medical value. In the recent past, the increasing number of pilgrims, infrastructure development, and extended duration of the pilgrimage route have added to environmental pressure on the area. The pilgrimage route is currently faced by many challenges that threaten its sustainability: solid waste accumulation, plastics contamination, declining water quality, degradation of the pathways, habitat disturbance, and carbon footprint.

This review analyzes the environmental impacts of Shri Amarnath Ji Yatra and the possible inclusion of eco-stewardship in relation to the religious tourism. Based on a thorough analysis of the existing scientific literature, policy documents, press releases and sustainable mountain tourism models, the paper proposes a "Green Yatra" framework, which underlines responsibility during pilgrimage, biodiversity conservation and ecosystem restoration with community involvement. Biodiversity conservation in the Himalayas, particularly focusing on medicinal plants and sustainable management methods has been discussed in detail in the paper, as reconciliation between religion and the environment. It is emphasized in this paper that the Shri Amarnath Ji Yatra has the potential of being a sustainable pilgrimage destination through a planned participatory and restoration approach.

KEYWORDS: Amarnath Yatra; Green Yatra; Kashmir Himalaya; mountain tourism; eco-stewardship; medicinal plants; sustainable pilgrimage.

1. INTRODUCTION

Mountain environments contribute disproportionately to providing ecosystem services per unit area through provision of water, biodiversity, and culture, but are also very vulnerable to changes in climate and land use (IPCC, 2019; UNEP-WCMC, 2002). Himalayan mountain environments, in particular, provide sources of headwaters for hundreds of millions of people and important fractions of global mountain biodiversity, but are increasingly experiencing accelerated glacier retreat, alteration of snow regimes, and growing risks as a result of warming trends (IPCC, 2019; Dyurgerov and Meier, 2005). It is within such an environment that religious and spiritual tourism has seen dramatic growth with mountain pilgrimage trails serving as disputed socio-ecological environments (Doerner, 2016; Yousuf, 2018; Khan *et al.*, 2018)..

The Shri Amarnath Ji Yatra, run by the Shri Amarnathji Shrine Board (SASB), provides an example of all these aspects. The official guidelines stress the need for keeping the surroundings clean, avoiding plastic, but the independent evaluation says that the existing pattern is a “sleeping environmental catastrophe waiting to happen,” which needs substantial changes in planning and management (SASB, n.d.; Yousuf, 2018; JKCCS & EQUATIONS, 2017). The present work provides a brief overview of the religious importance of the Yatra and its environmental issues, as well as possible ways of creating a Green Yatra.

The Amarnath Cave, which lies at an elevation of about 3,800–3,900 m above sea level in the Kashmir Himalayas, is worshipped by Hindus owing to the naturally occurring ice stalagmite considered to be the manifestation of Lord Shiva, and thus the Yatra is an example of "faith tourism" trekking through challenging yet sacred environment (Doerner, 2016; Yousuf, 2018). The earlier years saw less accessibility and lesser number of pilgrims, but with improved accessibility, security, and promotions, the number of pilgrims has risen to several hundred thousand per year (Khan *et al.*, 2018; JKCCS & EQUATIONS, 2017).

Ecologically, the Pahalgam-Baltal-Amarnathyatra corridor passes through temperate conifer forests, krummholz of *Betula utilis*, alpine meadows, and nival regions, with an assemblage of species representing the floral and faunal components typical of the western Himalayas (Mir *et al.*, 2023; Khan *et al.*, 2018). The glaciers feeding the streams ensure the provision of water security downstream, and the region provides regulating, supporting, and cultural ecosystem services consistent with wider assessments made about the Himalayas (IPCC, 2019). This combination of spiritual centrality and ecological sensitivity makes the Yatra corridor a critical site for integrated conservation and sustainable pilgrimage planning.

2. METHODOLOGY

In order to analyze the socio-ecological interactions and environmental effects associated with the Shri Amarnath Ji Yatra, the following research used structured narrative review and analysis methodology. The methodology adopted for the present research entailed the process of conducting a systematic review of literature through published scientific research papers, peer-reviewed journals, policy frameworks, and institutional publications. These were systematically reviewed under several main themes: mountain ecosystem services, effects of pilgrim tourism, alpine pollution, Himalayan medicinal plants, and climate resilience at high altitudes.

Literature selection included different types of sources, such as: (1) academic literature that provides an analysis of the ecological and spatial effects of the Yatra and high-altitude tourism in Kashmir; (2) world reports on

cryosphere processes, mountain biodiversity, and sustainable tourism practices from international; (3) policy reports and updates from governmental sources; and (4) reports from civil society organizations.

Analysis of the extracted information and data was conducted using thematic analysis, with an emphasis on analyzing pollution trends (solid waste, plastics, water contamination, damage to trails, and carbon emissions), ecological vulnerabilities along the corridor from Pahalgam-Baltal, and possible interventions that can be undertaken. Using the analysis results, a conceptual model of 'Green Yatra' was generated as an answer to this problem.

4. RESULTS AND DISCUSSION:

4.1 Environmental Challenges and Pollution Impacts

Results of findings synthesized from literature and field study reports reveal environmental stress and pollution effects linked to the Yatra, especially during extended periods of the pilgrimage when daily pilgrim numbers surpass the ecological carrying capacity of the area (Khan *et al.*, 2018; Yousuf, 2018; Doerner, 2016).

4.2 Solid Waste and Plastic Pollution

The generation of solid waste can be considered one of the most significant disruptions caused to the environment along the pilgrimage path. Huge amounts of organic food waste, plastic bottles, paper and textile packages, animal excreta, etc., pile up in base camps, transit camps, and high altitude paths. Administrative data show that more than 100 tonnes of waste are produced and collected only in the initial days of the Yatra, which add up to several hundred tonnes each pilgrimage season (PIB, 2023; KL News Network, 2024; Times of India, 2026). Non-biodegradable plastics form a major proportion of the dry waste. Improper waste disposal and open dumping in rivers or alpine regions in the past have resulted in the micro-plastics pollution of the region (JKCCS & EQUATIONS, 2017; Doerner, 2016).

4.3 Water Quality Degradation and Aquatic Contamination

Lack of proper temporary sanitation, sewage discharge without treatment, and greywater handling from the campsites and commercial food outlets (langars) are responsible for bacterial and organic pollution of the pristine waterways of glacial origin. Water from surface runoff with organic pollution, animal excreta, and garbage is reducing the water quality at the upstream location, posing public health hazards and affecting the downstream aquatic ecosystem (Khan *et al.*, 2018; Yousuf, 2018).

4.4 Soil Erosion, Trail Degradation, and Habitat Disturbance

The dense movement of people and heavily loaded ponies, as well as the logistics transportation system, leads to soil compaction, vegetation destruction, and widening of the trails. The aforementioned activities promote slope instability, increase erosion on rainy days and contribute to destruction of fragile alpine meadows on the way to Pahalgam and Baltal routes (Khan *et al.*, 2018; Yousuf, 2018). In addition, the constant presence of people, high noise level caused by helicopters and crowds, artificial lighting at night and enlargement of camps disturb animals living on the mountains (IPCC, 2019; UNWTO, 2021).

4.5 Carbon Emissions and Cryospheric Impact

Transport logistics involve thousands of transporters moving over vast distances, many helicopters making sorties, and considerable dependence on diesel-powered generators to produce energy for the campsites. The emission of black carbon in the high-altitude cryosphere regions settles on the snow and glaciers in the area, thus decreasing their albedo, resulting in fast melting and melting of glaciers (IPCC, 2019).

A concise synthesis of key environmental pollution challenges and priority restoration actions is presented in Table 1.

Table1. Key environmental challenges and indicative restoration actions for a Green Yatra

Challenge	Main manifestations	Priority restoration/management actions
Solid waste, plastics	High per-capita waste; single-use plastics along trails	Zero-waste logistics, source segregation, plastic ban, material recovery
Water contamination	Sewage, grey water entering streams	Eco-sanitation, modular wastewater treatment, protected riparian buffers
Soil erosion, habitat loss	Trail widening, meadow trampling, camp sprawl	Trail rationalization, slope stabilization, alpine meadow restoration
Wildlife disturbance	Noise, lights, human presence in sensitive zones	Zoning, quiet hours, dark-sky measures, no-go habitats
Carbon emissions	Road traffic, helicopters, diesel power	Low-carbon transport, renewables, emission accounting

5. GREEN YATRA: CONCEPT AND PRINCIPLES

Green Yatra is seen in this context as a framework of pilgrimage which consciously combines spirituality with ecology. It involves principles of international mountain tourism guidelines, such as minimizing environmental footprint, conservation of biodiversity, promoting local economies, and enhancing climate change resilience (UNWTO, 2018, 2021; IPCC, 2019). Environment-related advice by SASB, banning plastics, and cleaning drives by Swachh Bharat Mission are preliminary examples of this framework, despite some limitations in their implementation (SASB, n.d.; PIB, 2023; JKCCS & EQUATIONS, 2017).

The Green Yatra model proposed in this study moves from Faith to Ecological Awareness to Responsible Pilgrimage to Ecological Restoration to Sustainable Development. Devotional drive is connected to ecological awareness via interpretation and messages; ecological awareness leads to responsible behaviors (such as reduced waste behavior and following designated paths); responsible behaviors are a basis for ecological restoration

behaviors; and finally, ecological restoration leads to sustainable development as per the national missions on climate and sustainable Himalayas (Doerner, 2016; Yousuf, 2018; Urooj and Chaudhary, 2022).

6. TRANSFORMING ECOLOGICAL INTENTIONS INTO ACTION-DRIVEN RESTORATION

Research on global mountain tourism indicates that the language of aspiration regarding sustainability does not translate into environmental impact without clearly defined goals, measurement, and accountability (UNEP, 2016; UNWTO, 2018, 2021). In the case of Amarnath Yatra, the main drivers would be:

- Carrying capacity based on science: ecologically based carrying capacities for the number of pilgrims per day and season, the opening dates for pilgrim trails, and campsite location considering climate-related hazard trends (Yousuf, 2018; IPCC, 2019).
- Operational waste and sanitation standards: enforced standards for waste reduction, segregation, backhauling, and eco-sanitation for all campsites and langars with clear data on the amount of waste and its destination (PIB, 2023; KL News Network, 2024).
- Sustainable restoration plans: long-term plans for restoring trails, grasslands and streams, rather than occasional clean-up activities (Khan *et al.*, 2018; UNEP, 2016).

Crowdsourcing platforms involving pilgrims and local youth in monitoring garbage accumulation areas, regrowth of vegetation, and stream clarity can enhance community involvement in the restoration process (Doerner, 2016).

7. CONSERVATION OF BIODIVERSITY AND MEDICINAL PLANTS ALONG THE PILGRIMAGE CORRIDOR

The Kashmir Himalayas have high plant diversity, consisting of an approximate 450 medicinal plant species belonging to 276 genera and 101 families that grow in the alpine and subalpine zones which the Yatra passes through (Mir *et al.*, 2023; Manzooret *al.*, 2023). Flagship plants, including *Aconitum heterophyllum*, *Picrorhizakurroa*, *Saussureacostus*, *Podophyllumhexandrum*, and *Dactylorhizahatagirea*, are threatened locally owing to overexploitation and loss of habitats (Mir *et al.*, 2023; Manzooret *al.*, 2023).

Green Yatra can help promote conservation of MAP through: limiting harvesting on the pathway; creating conservation areas within the in situ as well as MAPs in ex situ conservation zones around the base camp; and integrating community value chain of MAPs with certification systems that recognize harvesting which is in line with conservation (Mir *et al.*, 2023; UNEP, 2016). These initiatives are consistent with adaptation strategies based on ecosystem services that focus on conserving regulating and cultural services in addition to provisioning services (IPCC, 2019).

8. SUSTAINABLE MANAGEMENT AND RESTORATION STRATEGIES

Sustainable mountain tourism international guidance stresses planning that is integrative, diverse, and participatory (UNWTO, 2018, 2021). For the Amarnath Yatra, some of the important strategies are:

- Zero-waste logistics and plastic-free activities: based on the successes of SwachhTeerth campaigns, incorporating reusable dishes, refills, and reverse logistics of recyclable materials (PIB, 2023; KL News Network, 2024; Times of India, 2026).

- Eco-sanitation and water protection: through high-altitude toilets, grey water handling, and exclusion zones around the streams (Khan *et al.*, 2018; JKCCS & EQUATIONS, 2017).
- Pathway and slope rehabilitation: through bioengineering and indigenous plant species to stabilize erosion and consolidation of several informal pathways to the formal routes (Yousuf, 2018; IPCC, 2019).
- Low carbon activities: including controlled use of helicopters, encouraging shared transport by the surface, and renewable energy to power the camps in compliance with climate-resilient mountain tourism guidelines (IPCC, 2019; UNWTO, 2021).
- GIS, remote sensing and drones: to map the changes in land cover, waste generation areas and hazardous slopes, which can direct the efforts at restoration and hazard reduction (IPCC, 2019; UNEP, 2016).

9. POLICY FRAMEWORK AND GOVERNANCE RECOMMENDATIONS

To tackle the empirically observed pollution-related problems in this review and make the Green Yatra concept feasible for state-level governance, a binding policy mechanism is needed. The salient policy issues that can be derived from this analysis are:

- Requirement of Policy Integration in SASB Charter: Incorporate the Green Yatra principles within the statutory mission and policy directives of the Shri Amarnathji Shrine Board (SASB). Create legally binding goals for ecology, waste-management metrics, and annual environmental performance audits that SASB is mandated to publicly release (SASB, n.d.; JKCCS & EQUATIONS, 2017).
- Plan Conformity to Climate Action Plans and Biodiversity Strategies: Integrate Yatra environmental governance into the state's plans of climate change mitigation and biodiversity preservation. Utilize national and international funding schemes under frameworks like NMSHE and other climate financing options in order to build green transport infrastructure in the corridor area (Urooj& Chaudhary, 2022; IPCC, 2019).
- Institutionalization of Community Co-management Institutions: Establish formal institutions of community co-management which include local community, pastoralist, service provider (pony owner and palanquin bearer), and local youth. Ensure stakeholder representation in carrying capacity determination, waste logistics, route discipline, and benefits distribution (Doerner, 2016; Yousuf, 2018).
- UNWTO Sustainable Mountain Tourism Standards Adherence: Governance should comply with UNWTO and UNEP guidelines for sustainable mountain tourism, including setting up scientific carrying capacities, managing peak tourist flows per day, implementing stringent zero plastic policies, and ensuring diversified eco-tourism throughout the year in order to reduce stress in alpine ecosystems during particular seasons (UNWTO, 2018, 2021).

CONCLUSION

The Shri Amarnath Ji Yatra highlights an extreme confluence of religion, politics, economy and environmental hazards in the highly climate-sensitive Himalayan region. Prior studies and official documents reach the consensus view that, in the absence of any radical measures, the yatra is headed towards further ecological degradation and vulnerability but there is also significant scope for improvement in this regard (Doerner, 2016; Khan *et al.*, 2018; Yousuf, 2018, Bilal *et al.*, 2026). An approach to a Green Yatra based on the sequence Religion/Ecology Awareness/Responsible Yatra/Ecological Restoration/Sustainable Development constitutes a

holistic way forward in the conversion of the religious fervor into a drive for environmental restoration in the face of climate change challenges (UNEP, 2016; UNWTO, 2018; IPCC, 2019). If done right, the Amarnath Yatra would then set an excellent example of sustainable pilgrim practices in the Himalayas.

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