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Climate Change and the Future of Tourism Real Estate in the Western Ghats: Physical Climate Risk, ESG Transition, Carbon Regulation and Investor Behaviour

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Abstract

Tourism-based real estate in the Western Ghats, one of the world's most ecologically valuable and climate-sensitive biodiversity hotspots, is entering a decisive transition. Over the past two decades, resorts, homestays, boutique hotels and holiday homes in the region's hill destinations have been priced largely on scenic amenity, accessibility and tourism demand, with little regard for environmental risk. That logic is now under strain from two converging pressures. Intensifying rainfall, recurrent floods and increasingly frequent landslides expose these assets to rising physical climate risk through property damage, business interruption, and escalating maintenance and insurance costs. Simultaneously, the ESG transition and tightening carbon regulation are reshaping how tourism property is financed, insured, valued and governed. Adopting a conceptual, theory-building design, this paper synthesises fifty-seven studies spanning tourism, real estate finance, sustainable finance, carbon regulation and mountain-destination research. It develops the Climate–ESG–Carbon (CEC) Transition Framework, in which physical climate risk, ESG transition and carbon regulation operate as interacting channels converging on investor behaviour, and derives five propositions on risk capitalisation, finance and insurance constraints, ESG screening, regulatory stranding and behavioural adjustment. The paper argues that investment in the region is becoming simultaneously riskier and more complex, and that value is likely to migrate from hazard-exposed, carbon-intensive assets towards resilient, low-carbon and ESG-credible ones. It concludes with implications for investors, developers, lenders, insurers and policymakers, and outlines an agenda for empirical validation.

Keywords: ***Climate Risk, Tourism Real Estate, ESG, Carbon Regulation, Western Ghats***

1. INTRODUCTION

The Western Ghats is one of the world's most valuable biodiversity hotspots and a critical provider of ecosystem services, including freshwater supply, climate regulation, carbon sequestration, soil conservation and flood control, on which agriculture, local livelihoods and tourism depend (Anitha et al., 2024; Ramasamy & Saravanakumar, 2026). Over the past two decades, the hill destinations of the Ghats have witnessed rapid growth in tourism-linked real estate: resorts, boutique hotels, homestays, plantation bungalows converted to hospitality use, and holiday or second homes purchased partly as lifestyle assets and partly as investments. This asset class has traditionally been priced on scenic amenity, accessibility and tourism demand, with limited attention to environmental risk.

That pricing logic is now under strain from two directions simultaneously. On one side, climate change is amplifying the physical hazards to which the region is most exposed. Heavier and more erratic rainfall, recurrent floods and an increasing frequency of landslides threaten tourism destinations, infrastructure and local communities across the ecologically fragile landscapes of the Ghats (Cherian, 2025). Such hazards damage buildings and access roads, interrupt tourist seasons, and raise operating, maintenance and insurance costs for tourism enterprises (Gössling & Scott, 2026; Mota et al., 2026). On the other side, the global transition towards sustainability is redefining the rules of the game for real estate. Environmental, social and governance (ESG) expectations, green building standards, climate-related disclosure and carbon regulation are increasingly embedded in investment appraisal, lending and insurance decisions (Contat et al., 2024; Leutner, 2026; Thompson, 2025). Assets that fail to meet these expectations face the prospect of weaker demand, costlier finance and even stranding (Anjanappa & Singh, 2026).

The central argument of this paper is that tourism-based real estate investment in the Western Ghats is in a transition stage. The established regime, in which location and amenity dominated valuation and environmental risk was largely ignored, is giving way to an emerging regime in which physical climate risk is capitalised into prices, ESG performance operates as a screening and value criterion, and carbon regulation conditions the viability of carbon-intensive assets. During

this transition, investment becomes riskier, because hazard exposure is rising faster than adaptation, and more complex, because investors must now evaluate climatic, regulatory and reputational variables alongside conventional financial ones.

The paper pursues four objectives: (i) to synthesise the multidisciplinary evidence linking climate change, real estate and tourism investment; (ii) to develop an integrative conceptual framework, the Climate–ESG–Carbon (CEC) Transition Framework, tailored to tourism real estate in the Western Ghats; (iii) to derive research propositions on how physical climate risk, ESG transition and carbon regulation jointly shape investor behaviour; and (iv) to draw implications for investors, developers, financial institutions and policymakers. The paper contributes to the emerging climate economics of tourism real estate by connecting literatures that have so far developed largely in parallel and by grounding them in a specific, highly climate-sensitive Indian region.

2. REVIEW OF LITERATURE

2.1 Physical Climate Risk and Tourism Destinations

A substantial body of research establishes that climate change is a material economic and financial risk for tourism. Rising temperatures and extreme events such as floods, heavy rainfall, droughts, wildfires and storms damage tourism infrastructure, disrupt travel, increase operating and insurance costs, and erode the attractiveness and long-term value of climate-sensitive destinations (Gössling & Scott, 2026). Conceptually, climate risk arises from the interaction of hazard, exposure and vulnerability: hazards include floods, heatwaves, storms and landslides; exposure refers to the infrastructure, businesses and communities located in harm's way; and vulnerability reflects sensitivity and adaptive capacity (Gumel, 2022; Zovko et al., 2025). Evaluation frameworks stress that both the physical hazards and their economic consequences for infrastructure, visitor behaviour and local economies must be assessed to guide planning (Rosselló-Nadal, 2014; Kaján & Saarinen, 2013).

Destination-level studies show these risks translating into asset-level outcomes. Flood-risk assessments of tourist attractions demonstrate high vulnerability of hotels, resorts and transport facilities to inundation (Fang et al., 2016), while early work on coastal tourism warned that some destinations may effectively disappear as viable investments without adaptation (Jones & Phillips, 2009). Lodging establishments are especially exposed: floods, extreme rainfall, storms and water scarcity disrupt operations, damage property, raise maintenance and insurance costs, and affect occupancy and financial performance (Mota et al., 2026). Hotel-sector studies argue that disaster and climate resilience is therefore a business case, not merely an environmental obligation (Bentfeld et al., 2018; Nhep et al., 2021).

2.2 Climate Risk in Real Estate Markets and Finance

Real estate economics has begun to price climate. Comprehensive reviews document that both physical risks and transition risks reduce property values, raise insurance premiums, affect mortgage lending and influence investment returns, prompting investors, developers and financial institutions to embed climate risk assessment and ESG considerations in valuation and financing (Contat et al., 2024). Doctoral and applied work distinguishes physical risks that damage properties from transition risks that arise from stricter environmental regulation, carbon pricing and energy-efficiency requirements, and shows that both increasingly shape investment and financing strategies (Leutner, 2026). Evidence from listed vehicles indicates that investors in real estate investment trusts weigh climate exposure and sustainability performance when assessing long-run returns (Vasiliu, 2026). In tourism-dependent property markets specifically, hedonic evidence from outdoor tourism destinations shows climate conditions and hazard exposure influencing house prices, with resilient properties better able to hold value (Clark & Miller, 2025). For India, analysis of urban real estate identifies growing stranded-asset vulnerability, in which properties lose value or become economically unviable due to floods, heatwaves, extreme rainfall and water scarcity on the physical side and tightening carbon regulation and green building standards on the transition side (Anjanappa & Singh, 2026).

2.3 ESG Transition and Sustainable Finance

A parallel literature explains how sustainability has moved to the core of financial decision-making. Green and sustainable finance channels capital towards low-carbon development, renewable energy and green infrastructure, using instruments such as green bonds, sustainable investment funds and climate-related disclosure to align risk assessment with environmental performance (Thompson, 2025; Bandna et al., 2025). Financial markets are increasingly seen as central actors in climate adaptation and mitigation, with ESG principles integrated into lending, investment and portfolio management (Selvakumar et al., 2026). In India, the green economy agenda links climate resilience, green finance and ESG practice to national development strategy (Aher, 2025). Within tourism and real estate, ESG-and-KPI based resilience frameworks have been proposed for tourism, real estate and mixed-use developments, arguing that measurable environmental, social and governance performance improves the capacity of projects to anticipate, absorb and adapt to disruption and thereby protects long-term value (Anastasopoulos et al., 2026). Sustainable design research similarly shows that green building design, energy efficiency, renewable energy and climate-responsive architecture raise both the resilience and the investment value of tourism's built environment (Bozkurt, 2025).

2.4 Carbon Regulation and the Tourism Carbon Footprint

Tourism's exposure to carbon regulation follows from its emissions profile. Beyond transport, accommodation, food services, construction materials, energy use, water consumption, waste and supply chains generate a large and often underestimated indirect footprint, which strengthens the rationale for carbon accounting, emissions reporting, carbon

pricing and green building standards in the sector (Wang & Wu, 2025). Comparative analyses of per-tourist and total emissions confirm hotels and resorts as major emission sources through electricity, heating, cooling, water and waste systems (Xu & Gursoy, 2024), and bibliometric reviews document a rapidly growing research field around tourism carbon emissions, carbon neutrality and low-carbon tourism infrastructure (Liu et al., 2025). Long-standing work on tourism mobility shows that emission growth conflicts with climate policy targets unless technology is complemented by behavioural and structural change (Dubois et al., 2011; Cohen et al., 2014). The implication for real estate is direct: carbon-intensive tourism assets face rising compliance costs and reputational exposure as regulation tightens, while low-carbon assets gain a regulatory and market premium.

2.5 The Western Ghats and Comparable Mountain Destinations

Region-specific studies confirm that the Western Ghats combines exceptional ecological value with acute climate sensitivity. Its ecosystem services underpin tourism yet are threatened by deforestation, urbanisation, unplanned tourism and climate change (Ramasamy & Saravanakumar, 2026; Anitha et al., 2024). Research on Kerala's Ghats landscapes documents increasing frequency of floods, landslides and extreme rainfall that endanger destinations, communities and tourism infrastructure, and recommends eco-tourism, climate-resilient infrastructure, community participation and responsible land-use planning (Cherian, 2025). Comparable mountain regions offer converging lessons: Himalayan studies of district-level planning, SDG 13 strategies and mountain tourism show that floods, landslides, cloudbursts and extreme rainfall demand climate-risk-informed development planning, resilient infrastructure and ecosystem conservation if tourism growth is to be sustained (Panda et al., 2024; Dar et al., 2026; Biswas & Kumar, 2024; Kumar et al., 2023). These findings are directly transferable to the Ghats, whose hill destinations share the hazard profile of steep, high-rainfall, ecologically fragile terrain.

2.6 Adaptation, Resilience and Adaptation Finance

The adaptation literature identifies the pathways through which destinations can manage these risks: climate-resilient infrastructure, spatial planning that steers development away from hazardous locations, disaster risk management, ecosystem conservation and stakeholder collaboration (Jaiswal et al., 2024; Papageorgiou, 2025; Rahman et al., 2024; Jarratt & Davies, 2020). Adaptation is also demand-relevant, since tourists prefer destinations with visible resilience measures (León et al., 2023), and supply-relevant, since adaptive capacity differentiates the tourism businesses that survive disruption from those that do not (Horne et al., 2024). Finance is the binding constraint. Reviews of adaptation finance show a growing but unevenly distributed funding landscape in which the most vulnerable regions and sectors are often underfunded, and call for finance that demonstrably reduces climate risk rather than merely signalling commitment (Chadha, 2026; Venner et al., 2024; Verschuur et al., 2025; Khan et al., 2020). Climate-resilient tourism development also strengthens investor confidence and destination competitiveness (Becken, 2026; Tran et al., 2026).

2.7 Research Gap

Three gaps emerge from this synthesis. First, the climate–real estate literature concentrates on urban and coastal markets, while tourism real estate in tropical mountain regions remains under-theorised despite facing a distinctive flood–landslide hazard profile. Second, physical risk, ESG transition and carbon regulation are usually analysed separately, whereas investors in practice confront them jointly. Third, the behavioural dimension—how investors actually perceive, discount or overreact to climate and regulatory signals—is rarely integrated with the asset-level evidence. This paper addresses these gaps by developing an integrative framework for the Western Ghats.

3. METHODOLOGY

The paper adopts a conceptual, theory-building design based on an integrative review. Fifty-seven scholarly sources—journal articles, book chapters, books and doctoral research published predominantly between 2009 and 2026—were assembled across five literatures: tourism and climate change; real estate economics and finance; ESG and sustainable finance; carbon emissions and regulation in tourism; and mountain-destination and Western Ghats studies. Sources were identified through database searches on combinations of climate risk, tourism real estate, ESG, carbon regulation, resilience and Western Ghats, and screened for relevance to tourism-linked property and investment. The analysis proceeded in three steps: thematic coding of the reviewed studies into the six themes reported above; identification of the causal mechanisms recurring across themes (hazard–exposure–vulnerability, risk capitalisation, ESG screening, regulatory stranding, and behavioural response); and synthesis of these mechanisms into an integrative framework and testable propositions. As a conceptual synthesis, the paper generates theory for subsequent empirical validation rather than reporting primary data.

4. THE CLIMATE–ESG–CARBON (CEC) TRANSITION FRAMEWORK

The CEC Transition Framework explains the current state of tourism real estate in the Western Ghats as the joint product of three risk channels converging on investor behaviour.

Channel 1: Physical climate risk. Following the hazard–exposure–vulnerability logic (Gumel, 2022; Zovko et al., 2025), the Ghats present intensifying hazards (extreme rainfall, floods, landslides), high and growing exposure (resorts, homestays and holiday homes built on slopes, river margins and forest fringes), and elevated vulnerability (fragile terrain, degraded ecosystem buffers, limited drainage and access infrastructure). This channel operates on asset values through direct damage, business interruption, rising insurance and maintenance costs, and demand effects as perceived destination safety declines (Gössling & Scott, 2026; Mota et al., 2026; Clark & Miller, 2025).

Channel 2: ESG transition. Sustainable finance re-prices assets according to environmental and governance performance. Lenders, insurers and institutional investors increasingly screen for energy efficiency, water management, biodiversity safeguards, community relations and disclosure quality (Thompson, 2025; Selvakumar et al., 2026; Anastasopoulos et al., 2026). In an ecologically sensitive landscape, ESG conformity is not cosmetic: it determines access to capital and insurance, and it aligns assets with conservation-oriented land-use governance.

Channel 3: Carbon regulation. Tourism's large direct and embodied carbon footprint (Wang & Wu, 2025; Xu & Gursoy, 2024) exposes accommodation assets to carbon accounting, disclosure obligations, green building codes and prospective carbon pricing within India's green economy agenda (Aher, 2025). Carbon-intensive, energy-inefficient properties face escalating compliance costs and stranding risk, while low-carbon assets capture regulatory and reputational premia (Anjanappa & Singh, 2026; Contat et al., 2024).

Outcome: the transition stage. The three channels interact rather than merely add. Physical hazards raise the salience of environmental performance; ESG frameworks internalise both hazard resilience and carbon performance; and carbon regulation reinforces the financial materiality of ESG. Their convergence moves the market from an amenity-driven regime to a risk-adjusted, sustainability-screened regime. Table 1 summarises the markers of this transition.

Table 1. Markers of the transition stage in Western Ghats tourism real estate

Dimension	Established regime	Emerging regime
Valuation basis	Scenic amenity, location, tourism demand	Risk-adjusted value net of hazard exposure, ESG and carbon performance
Risk focus	Market and construction risk; climate ignored	Physical climate risk plus transition (ESG, carbon) risk
Finance and insurance	Standard credit appraisal; insurance routinely available	Climate screening in lending; rising premiums; cover restricted for high-hazard sites
Regulation	Building and land-use rules loosely enforced	Eco-sensitive zoning, green building norms, disclosure and carbon compliance
Asset design	Conventional construction on slopes and river margins	Climate-resilient siting, drainage, slope protection, low-carbon design
Investor behaviour	Amenity- and appreciation-driven; climate risk discounted	Disaster-salient, ESG-screened, resilience-seeking; bifurcated demand

4.1 Propositions

Proposition 1 (Risk capitalisation). As flood and landslide events recur, physical climate risk is increasingly capitalised into Western Ghats tourism property values, widening the price gap between hazard-exposed and resilient assets (Clark & Miller, 2025; Contat et al., 2024).

Proposition 2 (Finance and insurance channel). Climate risk assessment by lenders and insurers raises the cost and reduces the availability of debt and cover for high-hazard, low-resilience tourism assets, independently of realised damage (Leutner, 2026; Mota et al., 2026; Vasiliu, 2026).

Proposition 3 (ESG screening). ESG performance functions as both a screening criterion and a value driver: tourism properties with credible environmental, social and governance credentials attract capital on better terms and command occupancy and price premia (Anastasopoulos et al., 2026; Thompson, 2025; Bozkurt, 2025).

Proposition 4 (Regulatory stranding). Tightening carbon regulation and green building standards create stranded-asset risk for carbon-intensive, non-compliant tourism properties, particularly older energy-inefficient stock in ecologically sensitive locations (Anjanappa & Singh, 2026; Wang & Wu, 2025; Aher, 2025).

Proposition 5 (Behavioural adjustment). Investor behaviour adjusts through behavioural rather than purely rational channels: climate risk is under-weighted in calm periods and over-weighted immediately after salient disasters, while ESG labels serve as heuristics under regulatory ambiguity, producing volatility and herding during the transition stage (Contat et al., 2024; León et al., 2023).

5. DISCUSSION: RISKIER AND MORE COMPLEX INVESTMENT

The framework substantiates the paper's core claim. Investment in Western Ghats tourism real estate is becoming riskier because the hazard side of the risk equation is deteriorating faster than the adaptation side: rainfall extremes, floods and landslides are intensifying in precisely the locations—slopes, valleys and riverbanks—where tourism assets cluster, while resilient infrastructure, early warning systems and ecosystem restoration lag behind (Cherian, 2025; Jaiswal et al., 2024; Panda et al., 2024). It is becoming more complex because the decision problem now spans at least three regulatory and informational domains beyond conventional appraisal: quantifying site-specific physical risk under uncertainty;

demonstrating ESG performance to financiers, insurers and increasingly climate-aware guests; and anticipating the trajectory of carbon and environmental regulation. Each domain carries its own metrics, disclosure expectations and expertise requirements, and their interactions are non-linear.

The behavioural economics lens sharpens this picture. Bounded rationality and myopia lead many individual investors to discount low-probability, high-severity hazards until a disaster makes them salient, after which risk perception and prices can overshoot; ambiguity aversion in the face of evolving eco-sensitive zoning and carbon rules can freeze investment even where projects are viable; and ESG certification functions as a trust heuristic that simplifies choice but invites greenwashing where verification is weak. The transition stage is therefore likely to be marked not by a smooth repricing but by discontinuities: post-disaster corrections, flight-to-resilience episodes, and a widening bifurcation between certified, resilient assets and legacy stock. Comparable dynamics are documented in coastal and mountain destinations, where visible adaptation restores confidence and its absence accelerates decline (León et al., 2023; Jones & Phillips, 2009; Kumar et al., 2023).

The transition also redistributes value. Assets embodying climate-resilient siting and design, energy and water efficiency, biodiversity safeguards and community legitimacy are positioned to capture the premia that sustainable finance channels create (Bozkurt, 2025; Thompson, 2025; Becken, 2026). Conversely, the region's adaptation-finance deficit—mirroring global inequities in which the most vulnerable receive the least funding—threatens to leave smaller homestay and resort operators unable to finance resilience, concentrating stranding risk among precisely the community-embedded enterprises that sustainable tourism policy seeks to promote (Venner et al., 2024; Khan et al., 2020; Verschuur et al., 2025).

6. IMPLICATIONS

For investors, climate due diligence should become standard practice: site-level hazard–exposure–vulnerability assessment before acquisition, stress testing of cash flows for flood and landslide interruption, and portfolio screening on ESG and carbon performance (Zovko et al., 2025; Leutner, 2026; Vasiliu, 2026).

For developers and hoteliers, resilience is the emerging source of competitive advantage: hazard-informed siting, slope and drainage engineering, climate-responsive and low-carbon design, business continuity planning, and credible certification convert climate exposure into a marketable resilience proposition (Bozkurt, 2025; Bentfeld et al., 2018; Jaiswal et al., 2024).

For banks and insurers, the findings support integrating climate risk into credit appraisal and pricing for tourism property in the Ghats, while developing green and adaptation-linked products—green mortgages, resilience-linked loans, parametric insurance—that finance risk reduction rather than merely excluding risk (Thompson, 2025; Selvakumar et al., 2026; Chadha, 2026).

For policymakers, the priorities are hazard-informed spatial planning that steers tourism development away from the highest-risk slopes and floodplains, enforcement of green building and environmental norms, investment in early warning and resilient public infrastructure, ecosystem conservation as natural risk infrastructure, and channelling adaptation finance to small tourism enterprises and local bodies (Papageorgiou, 2025; Panda et al., 2024; Ramasamy & Saravanakumar, 2026; Verschuur et al., 2025).

7. LIMITATIONS AND FUTURE RESEARCH

As a conceptual synthesis, the paper does not report primary data, and its propositions await empirical testing. Future research should (i) estimate hedonic price effects of flood and landslide exposure on tourism property in Ghats districts; (ii) survey investors, developers and lenders on climate risk perception, ESG screening practice and post-disaster behaviour to test the behavioural propositions; (iii) audit the carbon and energy performance of accommodation stock to quantify stranding exposure under alternative regulatory scenarios; and (iv) evaluate adaptation-finance mechanisms suited to small tourism enterprises. Longitudinal designs spanning disaster events would be especially valuable for observing the repricing dynamics theorised here.

8. CONCLUSION

Tourism real estate in the Western Ghats stands at an inflection point. Climate change is converting the region's defining assets—its rainfall, slopes and forests—into sources of material financial risk, while the ESG transition and carbon regulation are rewriting the criteria by which tourism property is financed and valued. Synthesising fifty-seven studies, this paper has characterised the resulting condition as a transition stage and formalised it in the Climate–ESG–Carbon Transition Framework and five propositions. The direction of travel is clear: value will migrate from hazard-exposed, carbon-intensive, amenity-priced assets towards resilient, low-carbon, ESG-credible ones. Whether the Western Ghats experiences this transition as an orderly repricing or a sequence of disaster-driven corrections will depend on how quickly investors, financiers and policymakers internalise climate risk—and on whether adaptation finance reaches the destinations and enterprises that need it most.

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