Assessing 25 Years of Ecotourism Research in India: A Bibliometric Analysis of Trends and Rajasthan's Path to Sustainable Tourism

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Abstract

Placing great importance to environmental conservation and economic development, ecotourism is essential to sustainable tourism and has attracted considerable attention in academic research. This bibliometric study aims to provide a comprehensive overview of trends, insights, and growth of ecotourism literature in India. Ecotourism has gained world attention as a sustainable approach to tourism reconciled economic control and ecologic reservation. This study employed a bibliometric analysis to evaluate 310 ecotourism articles published between 2000 and 2025, sourced from the Scopus database. Biblioshiny and VOSviewer software were used to analyze the data. Some significant patterns and relationships were revealed in the domain by conducting a bibliographic coupling network analysis of the 323 texts and establishing a conceptual framework from keyword co-occurrence analysis.

Keywords: Ecotourism, sustainable tourism, environmental preservation, economic development, bibliometric analysis, Scopus.

Introduction

As an important part of sustainable tourism, ecotourism has attracted considerable attention from researchers and policymakers for its potential to advance environmental protection and boost (Gould et al., 2020; Pawaskar& Mhatre, 2021). This unique tourist approach largely complies with sustainability imperatives, reacting to the growing worldwide need for an interface between ecological well-being and socio-economic progress (Honey, 2008; Stronza& Durham, 2008). Guiding its research priorities, recent progress in the study of ecotourism has emphasized its potential to mitigate environmental exploitation at the same time as it increases local livelihoods, thus marking it as an important area of academic inquiry (Buckley, 2009; Weaver & Lawton, 2010).

This sustainable tourism has received worldwide attention, particularly in regions with rich biodiversity and cultural heritage, such as India (Scheyvens, 1999; Goodwin, 1996). With its diverse ecosystems and

rich cultural heritage, India is a unique site for studying the development and impacts of ecotourism practices (Rao, 2021; Singh & Singh, 2019). Academics have acceded to the importance of ecotourism in pursuing a balance between development and nature and culture preservation (Tisdell & Wilson, 2002; Balmford et al., 2009).

Bibliometric analyses have become imperative in ascertaining the trends, insights, and advancements made in the field of ecotourism research in India. Such methods aid in systematically evaluating scholarly contributions and mapping the intellectual landscape of the field over time (Donthu et al., 2021; Zupic&Černilogar, 2015). A comprehensive bibliometric analysis of 310 articles that came from the Scopus database and were published between 2002 and 2024 elaborates on the evolution and focus of ecotourism research in the Indian context (van Eck & Waltman, 2010; Aria & Cuccurullo, 2017).

This study used Biblioshiny and VOSviewer to carry out keyword co-occurrence and bibliographic coupling network studies. Such approaches allow the identificationof the emergence of significant patterns, conceptual structures, and collaboration links in the field of study of ecotourism (Chen, 2006; Leydesdorff et al., 2010). This bibliometric analysis provides a granular view of the interplay of forces shaping ecotourism research in India while unraveling the linkages between major themes and authors (Kessler,1963; Small, 1973).

India has seen considerable development in ecotourism due to its unique natural and cultural resources, which include the Himalayan highlands, coastal mangroves, and desert systems (Bhardwaj, 2020; Bhattacharya & Basu, 2021). Kaziranga, Periyar, and Ranthambhore are some national parks and wildlife sanctuaries that have become crucial hubs for ecotourism, attracting both domestic and international tourists and facilitating conservation efforts (Banerjee et al., 2022; Karanth et al., 2021). The engagement of local people in ecotourism programs has been crucial, ensuring both economic benefits and participatory conservation practices (Kumar & Sinha, 2019; Mishra & Sharma, 2020).

While there is potential, the growth of ecotourism in India faces challenges with the lack of infrastructure, an educated workforce, and tensions between development and conservation (Gupta et al., 2021; Chaturvedi, 2018). Additionally, the impact of mass tourism often breaks into ecotourism sites and hinders their biological purity (Singh et al., 2020; Anand & Goswami, 2019). Addressing these challenges will require a multi-stakeholder approach involving government policy, private sector engagement, and community involvement (Pandey & Pandey, 2020; Reddy & Reddy, 2017).

Various state policies, such as the Ecotourism Policy of India, aim to promote sustainable practices; however, such policies are disparate across states (Sharma & Singh, 2018; Joshi et al., 2019). Success stories from states like Kerala and Sikkim (Rao et al. 2020; George et al. 2021) showcase the achievability of ecotourism, given the relevant policies and community-based structures (management, ownership, etc.). These examples highlight the need for reproducible models to reconcile ecological preservation with economic interests (Biju, 2021; Thomas et al., 2022).

The role of technology and new services in enhancing ecotourism experiences is an ever more important area of emphasis. Mobile applications, virtual reality, and GIS-based technologies also enhance experiences but mitigate physical impacts on sensitive ecosystems (Chaudhary et al., 2021; Banerjee & Dutta, 2022). Additionally, quantifying the carbon footprint of ecotourism initiatives has paved the way for implementing more sustainable tourist practices (Jain & Agarwal, 2020; Mehta et al., 2021).

With climate change and biodiversity decline, ecotourism in India is a practical option for sustainable development (Chopra & Yadav, 2019; Gupta et al., 2020). Stakeholders must understand policy, community, and technology interplay to leverage ecotourism while maintaining the Country's biological legacy (Narayanan & Mohanty, 2022; Verma et al., 2021).

Research Questions

As an important area of sustainable tourism research, ecotourism has become one of the most criticized types of tourism because it can be used to reconcile economic growth with environmental conservation and protection (Honey, 2008).

RQ1. What are the temporal trends concerning the volume of publications and citations in the ecotourism sector in India?

RQ2. Which authors, documents, countries, and journals contributed significantly to ecotourism research in India?

RQ3. What if any insights can be gained from co-citation analysis of authors, construction analysis of nations, and co-occurrence investigation of keywords within the ecotourism area?

RQ4. Over the years, research in India's ecotourism sector has been reflected through the bibliographic coupling of documents.

RQ5. What are some of the emerging research trends that can be derived from the bibliometric data on ecotourism in India?

Literature Review

Ecotourism is essential in sustainable tourism, centered on the preservation of the natural environment, as well as socio-economic development. Due to India's rich biodiversity and cultural heritage, ecotourism is particularly significant (Das & Chatterjee, 2015). Studies have highlighted its potential to support rural development, particularly in areas adjacent to protected areas (Banerjee, 2021).

Many publications show that in the development of sustainable ecotourism programs, the respective government policies and involvement of the locals have the utmost importance. In many states, sustainable tourism initiatives are being taken in line with the Government of India's successful implementation of the Ecotourism Policy 2018 (Sharma & Gupta, 2020). These usually include local populations in the project, ensuring economic benefits and improving the conservation efforts (Rastogi, 2019).

The different technological advancements have influenced the ecotourism research and its practices. Geographic Information Systems (GIS) and remote sensing have been used to identify potential ecotourism sites and analyze environmental impacts (Verma et al., 2022). Social networks/media and digital marketing strategies have also marketed lesser-known destinations, easing pressure on popular tourist attractions (Kumar & Bansal, 2021).

Methodology

The current study used data collected from bibliometric analysis during the last 25 years (2000–2025) in the Scopus database published by Elsevier. Despite the use of tools such as Web of Science, Semantic Scholar and other more extensive online databases (Google Scholar) for bibliometric analysis by academics in recent years (Aguillo, 2012; Bamel et al., 2020), and the absence of Google Scholar from consideration as one of the most extensive databases has been based on such assertions in that there is a lack of capability to give precise information during bibliometric network analysis (Benckendorff& Zehrer, 2013).

Bibliometric Analysis

Bibliometric analysis is defined as a mathematical and statistical approach used on books and other communication forms (Pritchard, 1969), (De Bellis, 2009) noted that the quantitative analysis of empirical data in published literature is carried out to investigate publication patterns in a field and this work is referred to as bibliometric analysis.

You can identify co-occurring factors in your field of interest using bibliometric analysis. Bibliometric analysis may be combined with scientific mapping techniques (Cobo et al., 2011).

A literature analysis from 2000 to 2025 shows decreasing annual growth (-5.39%) that could reflect saturation or a shift in research trend (310 documents from 198 sources). The bob leaves this field with a moderate influence, as this field has an average document age of 5.93 years and an average of 14.23 citations per document. The dataset includes 778 authors, reflecting a prominent collaborative tendency with an average of 3.02 co-authors for each document. The rate of international collaborations is 20.65%, and single-authored works are limited (63 papers). From 1037 Keywords Plus and 1036 Author's Keywords, a broad thematic focus is evident, demonstrating a wide-ranging research horizon. This search returned 290 documents, the majority being journal articles (232) and

book chapters (53) and only minimally conference papers (7), which emphasizes peer-reviewed scholarship but with limited participation in lively academic conversations. While the field showcases a fair share of scholarly contributions, there are several opportunities for greater international collaboration and newer research priorities.

Table 1: Annual Scientific Production in Ecotourism Research (2000–2025).

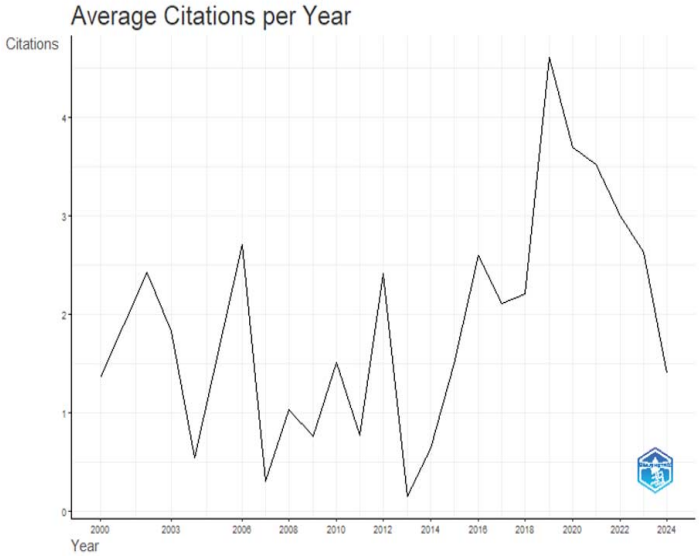
Main Information About Data	
Timespan	2000:2025
Sources (Journals, Books, Etc)	198
Documents	310
Annual Growth Rate %	-5.39
Document Average Age	5.93
Average Citations Per Doc	14.23
Keywords Plus (Id)	1037
Author's Keywords (De)	1036
Authors	778
Authors Of Single-Authored Docs	55
Single-Authored Docs	62
Co-Authors Per Doc	3.02
International Co-Authorships %	20.65
Article	232
Book	7
Book Chapter	53
Conference Paper	7
Conference Review	1
Erratum	1
Note	1
Review	8

Source: The author

Annual Scientific Production

Annual Scientific Production 2000-2025 Graph shows that the total number of articles published increases yearly. This output was relatively low and seemed to vary little until around 2012 when it began to trend upward substantially. We see a significant jump in publications after 2018, peaking sharply around 2023 at upwards of 40 articles. However, 2024 does show a substantial decline, which might indicate inadequate data, research interest shifts, or external factors affecting publication trends. The general trend is increasing scholarly attention to the field, particularly stark in the most recent years, notwithstanding the sharp decline registered in the most recent period.

Figure 1: Annual Scientific Production in Ecotourism Research (2000–2025).

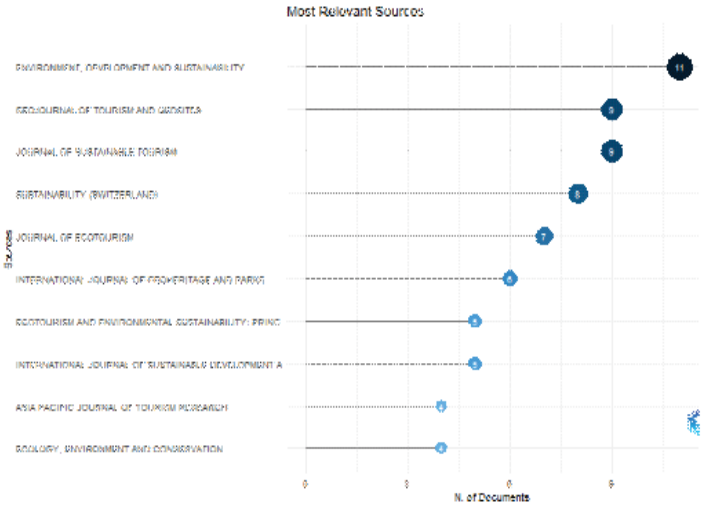


Source: The author, using Biblioshiny by R Studio, 2025

Most cited papers

The graph shows the main sources in the dataset, sorted by published documents. The first contributing source is Environmental, Development, and Sustainability, which produced 11 documents; Geojournal of Tourism and Geosites, which has 9 papers; and the Journal of Sustainable Tourism, which has contributed 9 documents. Moreover, the Sustainability (Switzerland) and Journal of Ecotourism show 8 and 7 papers, respectively, indicating a strong focus on sustainability and tourism-related studies. This multidisciplinary approach, which combines perspectives of tourism with environmental and economic issues, is highlighted by regular publications like the International Journal of Geoheritage and Parks and Economic and Environmental Sustainability Studies. This suggests that research in this domain is concentrated in a limited number of prominent journals, with sustainability, ecotourism, and a balance between competing economic and environmental interests emerging as key focus areas.

Figure 2.Most Cited Papers in Ecotourism Research.

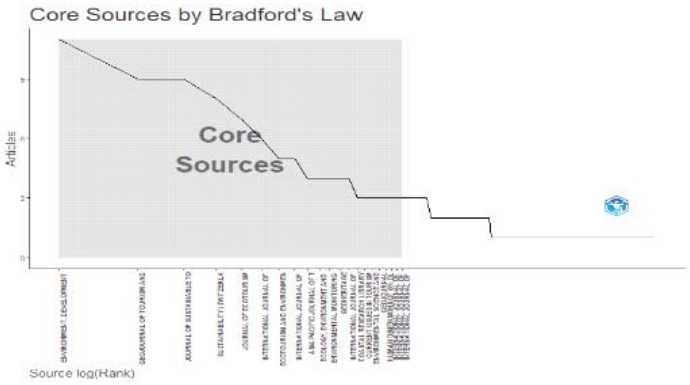


Source: The author, using Biblioshiny by R Studio, 2025

Bradford's law bibliometric analysis

The graph uses Bradford's Law to identify the chief sources that produce the respective field's research output. The shaded region highlights the most prolific source, with a clear break in the numbers of published articles (i.e., the "jump" of the padded bars) compared to others. The top sources are Environment, Development and Sustainability Geojournal of Tourism and Geosites Journal of Sustainable Tourism, which further testify to their primacy in knowledge transfer. The more lowly ranked the source, the fewer articles that source contributed to the literature, suggesting that most articles are being published in a few high-profile journals. In contrast,a few other sources produced much of the literature. This distribution pattern follows Bradford's Law, meaning a few core journals make up most publications while many peripheral sources produce fewer papers. The results point to the concentration of research in a relatively small number of top-tier journals, making them relevant for those interested in finding trustworthy literature.

Figure 3. Bradford's Law: Bibliometric Analysis of Research Output Sources.



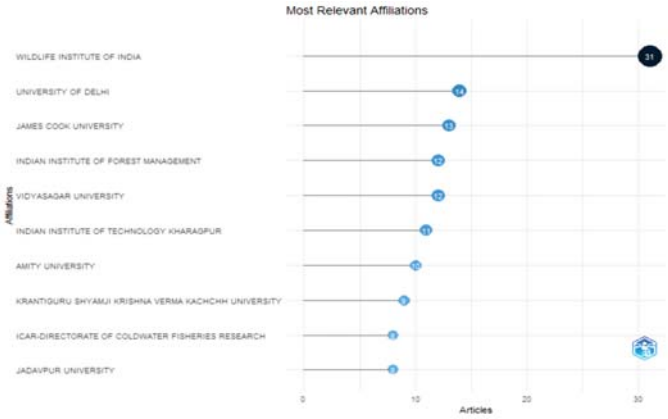
Source: The author, using Biblioshiny by R Studio, 2025.

Significant contributors to research

The visualization highlights the seminal keys the significant research contributors are making in this field. Conclusion The Wildlife Institute of India, however, is the top institution with 31 publications, the heaviest contributor among others. The University of Delhi (14) and James Cook University (13), followed by the Indian Institute of Forest Management (12), are also major contributors to research output. Institutions like Amity University and Jawaharlal Nehru University also have a strong strength in publications but are far lower than those mentioned above. The distribution shows that work in this space appears highly concentrated in a few

prestigious universities and research institutes with notable global collaboration at research institutes like James Cook University. It also reveals the importance of the specialized bodies of institutions of environmental management and tourism in the field of research and their role in institutions in terms of contribution to research.

Figure 4. Significant Contributors to Ecotourism Research



Source: The author, using Biblioshiny by R Studio, 2025.

Most cited Country

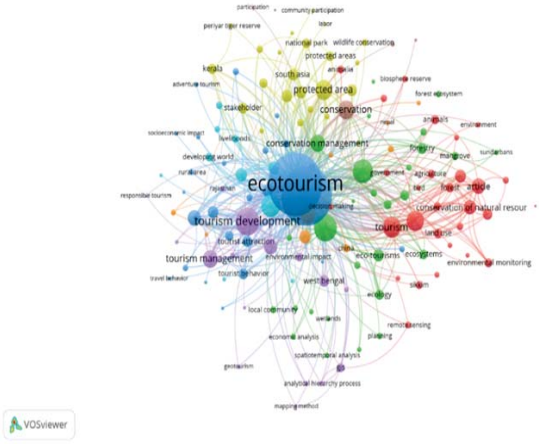
The visualization is based on the leading nations in terms of research contributions, ranked by the number of citations received. The main results are:

- Country-wise citations represent India as an emerging country with 2,472 citations. The many citations show that the research in India is widelyused and has a good academic impact.
- The United Kingdom (UK) (43 citations) and the United States (USA) (43 citations) have the second-highest number of citations. Notable contributions: China was responsible for 28 citations, while Australia had 18.
- Countries such as Canada, Indonesia, Poland, Bangladesh, and Germany show a particularly low number of citations. Here, we observe a solid concentration of impactful studies from India, with a subsequent contribution from English-speaking countries like the UK, USA, and Australia.

Keyword analysis

Keyword analysis reflects ecotourism as the main topic associated with tourism development, conservation, and sustainability. Keywords such as protected areas, wildlife conservation, and national parks stress environmental conservation, whereas livelihoods, local community, and economic analysis indicate socio-economic consequences. Rajasthan, Kerala, and the Sundarbans have regional preferences, as is evident from the geographic focus. Environmental monitoring, GIS, and land use reveal sustainability assessment exploration as a fitting research focus. Responsible tourism and adventure travel are cases in point. Hence, the analysis advocates that a balanced approach involving conservation, economic gains, and community development be considered for sustainable ecotourism.

Figure 5. Keyword Co-Occurrence Network in Ecotourism Research.



Source: The author, using VOSviewer, 2025

Network Analysis of Ecotourism in India

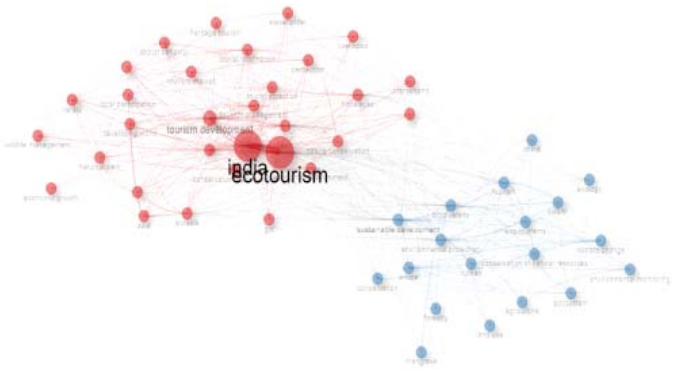
Similarly, ecotourism (305.87) and India (292.91) have the largest betweenness centrality in the network, revealing their role as potential intermediaries. The closeness centrality is relatively high at 0.0204, showing they are connected well in the network, along with their PageRank scores of 0.1244 and 0.1204, showing they influence the most. Key findings indicate that ecotourism links economic and environmental concerns, while hotspots include the Himalayas, Uttarakhand, Kerala, and Sikkim. Discussions on protected areas and conservation management policies highlight the importance of regulations as tools for fostering sustainable tourism.

Table 2. Network Analysis of Ecotourism in India.

Node	Cluster	Betweenness	Closeness	PageRank
India	1	292.911893	0.02040816	0.1204079
Ecotourism	1	305.87259	0.02040816	0.12441049
Tourism Development	1	21.2528728	0.01639344	0.04677836
Sustainability	1	10.4708582	0.01639344	0.03219477
Tourism Management	1	3.39783559	0.01388889	0.02462562
Protected Area	1	7.37135308	0.01515152	0.02642412
Tourist Destination	1	2.56281802	0.01315789	0.02200345
Conservation Management	1	2.3171381	0.01315789	0.01855876
Himalayas	1	5.61727444	0.01492537	0.02221242

Source: The author, using Biblioshiny by R Studio, 2025

Figure 6. Network Analysis of Ecotourism Research.



Source: The author, using Biblioshiny by R Studio, 2025.

Analysis of Thematic Map

Fundamental Themes (Lower Right)— Ecotourism, India, Tourism Development

These are important but understudied themes.

Seeding the ground by emphasizing their fundamental role in inquiry while needing more exploration, they set up the basis for ecotourism discussions.

Niche Themes (Top Left Corner) – Biodiversity, Protected Areas, Environmental Conservation

These are better articulated but less prominent themes.

With a focus on specific topics, like conservation and protected areas, that are critical but not fully mainstreamed into the broader conversation.

Motor Themes (upper right) — no identifications.

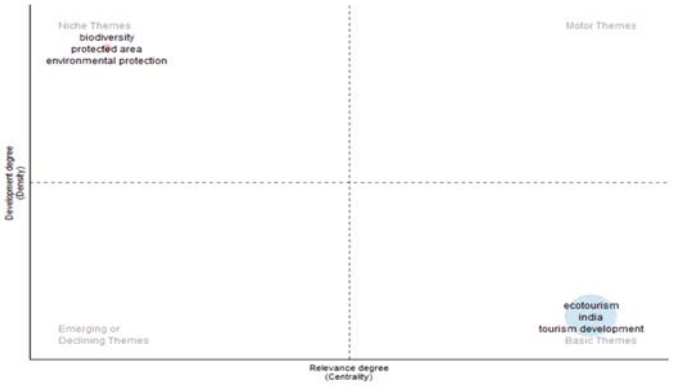
No themes are present in this quadrant; therefore, no topics are considered both highly relevant and highly developed.

This shows a lack of well-studied, important topics in ecotourism.

No new or waning themes have been highlighted in the lower left quadrant.

There are no topics here, implying no clear upswings or lagging areas within a dataset.

Figure 7. Network Analysis of Ecotourism in India



Source: The author, using Biblioshiny by R Studio, 2025.

Co-occurrence network

The co-occurrence network in the given figure highlights key concepts and their relationships in ecotourism research. The study exposes three primary focal areas:

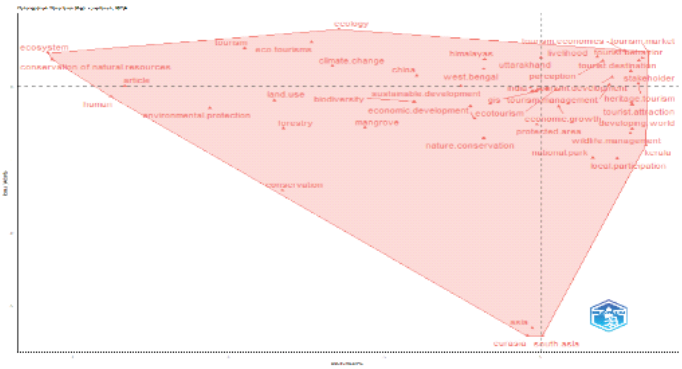
Environmental and Conservation Aspects: Terms such as ecosystem, conserve natural resources, biodiversity, ecological protection, management, forestry, and climate

change indicate a strong focus on sustainability and ecosystem management.

It highlights ecotourism's role in economic development, livelihoods, and destination management through tourism economics, tourism market, economic development, heritage tourism, and local engagement shows.

Geographic Focus: References to the Himalayas, Uttarakhand, Kerala, West Bengal, South Asia, and Eurasia point to important areas where ecotourism study is focused Ecotourism strategy reinforces that tourism management, economic growth, and conservation are interconnected. There remain gaps in high-level policy debate and implementation plans that highlight potential areas of future research

Figure 8. Co-Occurrence Network in Ecotourism Research.



Source: The author, using Biblioshiny by R Studio, 2025

Discussion

This bibliometric study of ecotourism research in India shows a dynamic yet inconsistent trend in the last 25 years. Driven by slow initial growth, research output exploded from post-2012 until it peaked in 2023 and then declined. This will require rethinking new research directions, incorporating newly developed methodologies, or deepening policy engagement.

One key finding is the concentration of research in high-impact journals like Environmental Development and Sustainability and Journal of Sustainable Tourism, which echo Bradford's Law. It appeared in leading multidisciplinary journals, representing a broader intersection with environmental science, economics, and sustainability. The limited engagement for conference papers (only seven) suggested little real-time academic discourse.

Network analysis highlights ecotourism and India as core research themes, with extended geographic hot spots in the Himalayas, Uttarakhand, Kerala, and Sikkim. However, no major themes emerged, suggesting possible saturation in the research.

It stresses the preservation of the environment, protectionof biodiversity, and community participation, which followsIndia's sustainability goals. Yet issues like poor infrastructure, workforce shortages, and tensions between conservation and commercialization remain. What these models — Kerala and Sikkim — show is underlined by policy inconsistencies facing the Country.

Technologies: Multidimensional Ecotourism Management technologies like GIS, virtual reality, and mobile applications have become an approach for ecotourism management. Nevertheless, measuring the carbon impact of ecotourism remains a new frontier.

India is the forerunner of ecotourism research with 2,472 citations worldwide, followed by the United Kingdom, the United States of America, China, and Australia. However, since only 20.65% of research papers are co-authored internationally, increasing collaboration across borders has the potential to improve the quality of research and disseminate best practices in sustainable tourism.

Conclusion

With data collected until January 2025, this bibliometric analysis offers insights into the trends, challenges, and future research directions in understanding ecotourism research in India. An upsurge in the number of publications, institutional interests, and attention to sustainability, conservation , and community development validates India's ecotourism growth.

But the moment is now a turning point for the field. The current decrease in research yield and the lack of clear emerging lines of research indicate a need for a new research agenda. Future research needs to investigate:

Policy Efficacy and Uniformity – Exploring the dissipation of all ecotourism policy frameworks across states in India and designing splittable models.

Technology-Driven Sustainable Practices – Widening the use of GIS, remote sensing, AI-based tourism analytics, and carbon footprint measurement in ecotourism management.

Community Engagement and Economic Models – Evaluating the sustainable economic and social benefits of community-based initiatives within the ecotourism sector.

Climate Change Adaptation – Analyzing the effect of climate change on ecotourism hotspots and the strategies to adapt.

Add greater global collaboration – Increase partnerships from institutions worldwide to bring in, broaden, and adaptive thinking.

Susia's contribution to the advancement of ecotourism research in India remains significant, and fostering interdisciplinary collaborations, evidence-based CP, and technological innovations will be essential to sustain this momentum. However, these further challenges also offer opportunities to aid the advancement of ecotourism in India.

Why Rajasthan Is One Of The Most Important Ecotourism Destinations

With a unique desert ecosystem, wildlife sanctuaries and cultural heritage, Rajasthan has great ecotourism potential. Wildlife: Echoes of Flora and Fauna cannot be disentangled from India's Wildlife:Echoes of Flora and Fauna are a huge draw for eco-tourists. Nonetheless, its sustainable development is hampered by obstacles like infrastructure deficits, water shortage, and policy divergences.

Overcoming this perils can also make Rajasthan a role model for responsible tourism in India. Rajasthan can be a role model for sustainable ecotourism development through effective policies, technology and local participation. All of this will also contribute to conservation and local livelihoods as well as cultural heritage—ensuring sustainable solutions for the long term in the region.

Limitations of the Study

Although this bibliometric analysis offers valuable insights into ecotourism research in India, several limitations need to be considered:

Limitation of Database – The study used only Scopus as its data source, excluding Web of Science and Google Scholar. This could result in excluding important studies published in non-indexed or regional journals.

Quantitative metrics – This analysis is based on bibliometric analysis, which can provide metrics related to publication trends, citation rates, and co-authorship networks, but not the qualitative impact or real-world implementation of ecotourism programs.

No Thematic In-Depth Explorations – Although network & keyword analyses highlightthe main themes in research, they lack in-depth thematic explorations or coverage of the socio-economic and environmental implications of the ecotourism policies.

Absence of Real-Time Insights – The analysis provides a retroactive view of trends but ignores any new emerging research published after the study's timeframe (2025). Moreover, there is no pursuit of early findings being shared through conference papers, which indicates how little we know about where academia is headed or if it is doing so.

Geographic Bias – While the study identifies areas of research intensity, it fails to evaluate ecotourism development in less studied regions, which could point to rich local case studies and indigenous knowledge.

Policy and implementation gaps — The study identifies ecotourism policies but does not discuss if or how effective they have been implemented and what execution challenges states across India face.

The study does have its limitations, but despite that, these findings are an excellent basis for future work and policy debates surrounding sustainable ecotourism in India.

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