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TRADITIONAL PLANT KNOWLEDGE IN CLIMATE- RESILIENT AND SUSTAINABLE TOURISM

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Abstract

Nature-based tourism is increasingly affected by climate change, creating a need for approaches that support sustainable transformation and local adaptation. Ethnobotanical knowledge, including traditional plant uses, management practices, and cultural meanings, remains an underexplored resource in tourism research. This paper examines the role of ethnobotanical knowledge in enhancing the sustainability and climate resilience of nature-based destinations. Using a conceptual and literature-based approach, the study integrates insights from ethnobotany, tourism studies, and climate change research. Findings suggest that ethnobotanical knowledge can support sustainable tourism by conserving biodiversity, diversifying tourist activities, reinforcing place-based identities, and promoting community participation. Incorporating ethnobotanical knowledge into tourism planning can enhance the adaptive capacity of destinations and contribute to the transformation of tourism systems towards greater resilience and sustainability under changing climatic conditions.

Key Words: *ethnobotany, climate change, sustainable transformation*

JEL classification: Q01, Q20, Q57

Introduction and Literature review

Nature-based tourism has grown significantly in recent decades due to increasing demand for outdoor recreation, authentic experiences, and environmentally oriented travel (Winter et al., 2020). At the same time, climate change is altering biodiversity patterns, ecosystems, and

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environmental conditions that support tourism, creating challenges for destination planning and increasing the need for sustainable and adaptive approaches (Welling et al., 2020). Research highlights resilience-oriented development as a key response, as climate-related impacts such as vegetation shifts, droughts, wildfires, and changing ecosystem services can reduce destination competitiveness while also encouraging diversification and innovation (Scott et al., 2012). In this context, local knowledge systems are increasingly recognized as important resources for climate adaptation. Ethnobotanical knowledge, which encompasses human–plant relationships, traditional uses, and management practices, supports livelihoods, food systems, and conservation (Berkes, 2017; Balick & Cox, 2020). It reflects long-term adaptation to environmental variability and can inform climate-resilient practices such as the use of drought-resistant species, seasonal harvesting, and diversified landscape management (Hosen et al., 2019; Dorji et al., 2024). Despite its relevance, ethnobotanical knowledge remains underrepresented in tourism studies, which primarily focus on protected areas, ecosystem services, and visitor management. Plant-related traditions and landscape knowledge can enrich tourism experiences while supporting sustainability goals. Activities such as heritage trails, foraging experiences, and interpretation of local flora diversify tourism products and reduce pressure on heavily visited sites. These initiatives align with growing demand for experiential, educational, and low-impact tourism (Ballantyne et al., 2011; Luković, 2026). Ethnobotanical knowledge also contributes to biodiversity conservation, as traditional practices often include sustainable harvesting methods, seasonal restrictions, and respect for ecological limits (Mandić et al., 2025). Integrating such practices into tourism can raise awareness of local ecosystems and strengthen conservation outcomes, particularly in the context of climate change. Another important contribution relates to place-based identity. Local plant species, traditional uses, and cultural narratives enhance destination distinctiveness and support branding strategies based on unique cultural–ecological relationships (Kumar et al., 2021). This perspective is consistent with research on cultural ecosystem services, which emphasizes the symbolic, educational, and recreational values of landscapes (Bachi, 2020). Incorporating ethnobotanical heritage into tourism interpretation can therefore strengthen visitor engagement while reinforcing community identity and pride. Community participation is equally important for sustainable tourism development. Local knowledge holders, including farmers, herbalists, and other community members, play a central role in maintaining ethnobotanical traditions. Their involvement in tourism development can support inclusive growth, knowledge transmission, and

adaptive governance (Benu et al., 2020; Lijun & Ahmed, 2024). In addition, ethnobotanical knowledge offers opportunities for tourism diversification through guided plant walks, traditional food preparation, educational workshops, and seasonal events (Panyadee et al., 2026). Such activities can extend tourism seasons, reduce spatial concentration of visitors, and promote environmentally responsible behavior, thereby enhancing both economic resilience and environmental sustainability (Jarratt & Davies, 2020; Papageorgiou, 2025). Although research on local knowledge and tourism is expanding, ethnobotany, climate adaptation, and tourism transformation are still largely studied separately. A more integrated perspective can demonstrate how plant-based knowledge simultaneously supports resilience, sustainability, biodiversity conservation, visitor experiences, and community participation. This paper therefore explores the role of ethnobotanical knowledge in sustainable tourism transformation and climate resilience, highlighting its potential to contribute to more adaptive and sustainable tourism systems.

Methodology

This study applies a conceptual and literature-based approach supported by secondary data from international sources. The analysis is based on a structured review of academic literature and global reports addressing ethnobotany, climate change, and nature-based tourism. Relevant publications were identified using academic databases (Scopus, Web of Science, and Google Scholar) and reports from international organizations such as FAO, UNEP, UNWTO, and IPBES. Keywords included ethnobotany, nature-based tourism, traditional plant knowledge, climate change adaptation, and sustainable tourism. The collected sources were analyzed using qualitative content analysis to identify recurring themes related to the role of ethnobotanical knowledge in sustainable tourism transformation. The findings were grouped into key dimensions, including biodiversity conservation, diversification of tourism activities, place-based identity, and community participation. In addition, selected global indicators and documented examples were synthesized to illustrate the relationship between ethnobotanical knowledge and climate resilience in nature-based destinations. The results are presented in a series of summary tables.

Results and discussion

Table 1 summarizes the main ways in which ethnobotanical knowledge supports sustainable tourism. It highlights the role of traditional plant

knowledge in biodiversity conservation, diversification of tourism activities, reinforcement of place-based identity, community participation, and environmental education. The examples illustrate practical applications and benefits that can enhance the sustainability and resilience of nature-based destinations.

Table 1: *Contributions of ethnobotanical knowledge to sustainable nature-based tourism*

Sustainable tourism dimension	Contribution of ethnobotanical knowledge	Examples / notes
Biodiversity conservation	Promotes protection of native plants and habitats; encourages sustainable harvesting	Use of medicinal and edible plants; maintenance of traditional agroforestry systems
Diversification of tourist activities	Enables development of new experiences based on local flora	Guided plant walks, foraging tours, workshops on traditional plant uses
Place-based identity	Reinforces local culture and traditions tied to plants	Cultural storytelling, festivals, and heritage trails featuring local species
Community participation	Involves local stakeholders in tourism planning and delivery	Engagement of herbalists, farmers, and community members in tourism programs
Environmental education	Raises awareness of ecological and cultural values	Interpretation of ecosystems, plant conservation education for visitors

Source: *Author's research*

Traditional plant knowledge not only supports biodiversity conservation but also provides a foundation for innovative and diversified tourism experiences. For instance, the use of native medicinal or edible plants in guided tours or workshops allows destinations to offer unique, educational activities while maintaining ecological integrity (Panyadee et al., 2026). The table also highlights the importance of place-based identity, showing how ethnobotanical traditions reinforce local culture and heritage. By integrating storytelling, festivals, and heritage trails that feature local species, tourism can promote a sense of authenticity and strengthen the connection between visitors and the destination. Another

important dimension is community participation. Engaging local knowledge holders, such as herbalists, farmers, and community members, ensures that tourism development benefits the host community and supports intergenerational knowledge transmission (Kohsaka & Rogel, 2021). This participatory approach can enhance the social sustainability of destinations and provide resilience against climate-induced changes (Marković Vukadin et al., 2025). The findings also point to the role of ethnobotanical knowledge in environmental education, offering opportunities to raise awareness about ecological processes and conservation needs.

Table 2 illustrates how ethnobotanical knowledge can be applied to enhance the climate resilience and adaptive capacity of nature-based tourism destinations. It emphasizes the role of traditional plant-based practices in addressing environmental variability, restoring and maintaining ecosystems, reducing vulnerability to climate-related hazards, and promoting efficient use of natural resources. Concrete examples include planting drought-resistant or seasonal plants, restoring degraded landscapes with native species, using fire-resistant vegetation for disaster risk reduction, applying traditional water-saving irrigation methods, and sustainably harvesting wild plants for educational or tourism activities. Additionally, ethnobotanical knowledge serves as a tool for knowledge transfer and awareness, through workshops and interpretive trails that teach visitors and local communities about climate-adaptive plant practices (Ballantyne et al., 2011). By integrating these approaches into tourism planning, destinations can foster ecological sustainability, strengthen socio-cultural resilience, and create engaging, educational experiences that respond to changing climatic conditions.

Table 2: *Role of ethnobotanical knowledge in enhancing climate resilience of nature-based tourism*

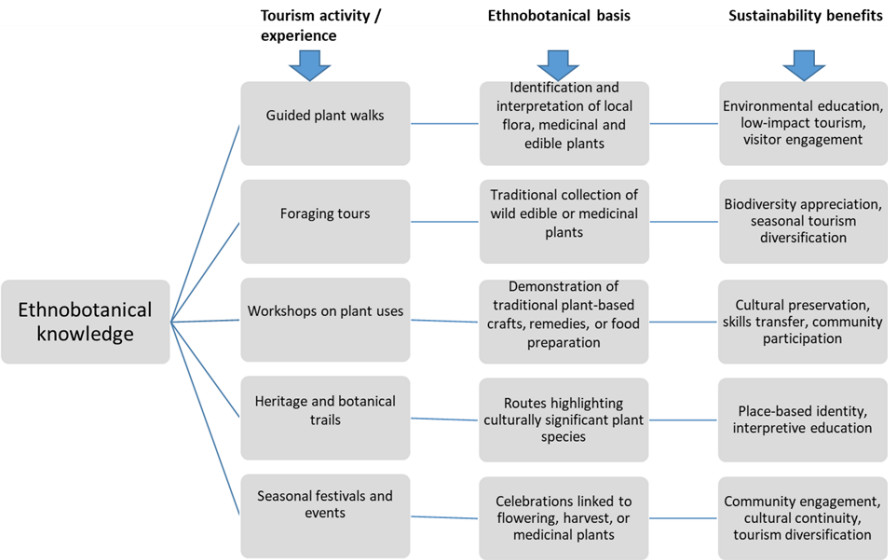
Climate resilience dimension	Role of ethnobotanical knowledge	Examples / applications
Adaptation to environmental variability	Identifies drought-resistant, seasonal, or multifunctional plant species	Use of resilient crops and plants in agro-tourism; seasonal plant-based activities
Ecosystem restoration	Supports regeneration of degraded landscapes using traditional practices	Reforestation with native species, restoration of medicinal plant habitats

Disaster risk reduction	Guides sustainable harvesting and landscape management to reduce vulnerability	Soil stabilization using native plants; fire-resistant vegetation in visitor areas
Resource efficiency	Encourages low-impact use of natural resources	Traditional water-saving irrigation, sustainable collection of wild plants
Knowledge transfer and awareness	Transmits climate-adaptive practices to visitors and local communities	Workshops on plant-based climate adaptation techniques, interpretive trails

Source: *Author's research*

Figure 1 presents a conceptual framework linking ethnobotanical knowledge with tourism activities and sustainability outcomes. It shows how activities such as guided plant walks, foraging tours, workshops on plant uses, heritage trails, and seasonal festivals are based on practices including plant identification, traditional harvesting, cultural interpretation, and local ecological knowledge. These experiences contribute to environmental education, biodiversity awareness, cultural preservation, community participation, and tourism diversification. The framework highlights the potential of ethnobotanical knowledge to support low-impact, educational, and community-based tourism while strengthening environmental and socio-cultural sustainability (Berkes, 2017). By involving local communities in knowledge transfer, interpretation, and resource management, ethnobotanical tourism can also enhance adaptive capacity to climate change (Rodríguez et al., 2018; Melo Gomes et al., 2026). Furthermore, such activities may support economic diversification and seasonal tourism development, particularly in rural and nature-based destinations, emphasizing the value of traditional plant knowledge for sustainable destination management and resilience-oriented tourism planning.

Figure 1: A conceptual framework of ethnobotanical tourism and sustainability outcomes



Source: *Author's research*

Conclusion

This study highlights the potential of ethnobotanical knowledge to support sustainable and climate-resilient tourism by contributing to biodiversity conservation, tourism diversification, place-based identity, community participation, and environmental education. Integrating traditional plant-related knowledge into tourism development can enhance ecological sustainability and socio-cultural resilience while promoting low-impact, educational, and experience-based tourism. Overall, ethnobotanical knowledge represents a valuable resource for adaptive and sustainable tourism development in the context of climate change.

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