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STAKEHOLDER PREPAREDNESS IN NATURE-BASED TOURISM GOVERNANCE: A SYSTEMATIC REVIEW AND FREQUENCY ANALYSIS OF NATURAL DISASTER RESEARCH

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ABSTRACT. *Nature-based tourism and recreation destinations present substantial challenges to the safety, sustainability, and resilience of these ecosystems due to their inherent vulnerability to natural disasters. This systematic literature review (SLR) provides a descriptive overview of the current research landscape and identifies trends in NBT disaster preparedness. A systematic search of scholarly databases was conducted for studies published between 2006 and 2023 on disaster preparedness in nature-based tourism. A PSALSAR framework was utilized in the review process to identify, screen, and select the pertinent studies. The inclusion criteria were met by 37 peer-reviewed articles. Throughout the included publication span, our frequency analysis showed a trend of growing research attention on disaster preparedness in NBT. The predominant research approaches employed were qualitative in nature, emphasizing the comprehension of stakeholder viewpoints through interviews and focus groups. Most of the NBT scholars covered climate-related disasters, which overlooked non-climate disaster studies. Data availability and quality were identified as the predominant limitations of the studies reviewed. Regarding stakeholder focus, the literature primarily emphasized NBT operators in terms of their capacities, challenges, and disaster preparedness measures. This review identifies opportunities for future research to develop a more comprehensive and holistic approach, highlighting the growing significance of disaster preparedness in NBT.*

INTRODUCTION

Nature-based tourism (NBT), which frequently involves destinations such as national parks and wilderness areas, is the component of tourism that is expanding at the quickest rate. The sector now accounts for approximately 7% of global tourism spending, contributing to over US$600 billion in revenue (WTTC, 2022). Additionally, the demand for NBT has increased since COVID-19, with rural areas and protected parks showing the growth in visitation and development (Haukeland *et al.*, 2023). NBT is also adopted in many developing countries as a means of both preserving natural resources and promoting economic growth (Balmford *et al*., 2009; Cheng *et al*., 2022). Despite the popularity of this

tourism segment, nature-based tourism is a sensitive and susceptible economic sector due to its physical proximity to the natural environment and resources (Ma *et al*., 2021; Dogru *et al*., 2019; Hambira *et al*., 2020; Rutty & Scott, 2013; Verbos *et al*., 2018). Any changes in the destinations, whether they are man-made or natural, pose serious safety and economic risks to tourism activities and their stakeholders. Along with an upsurge in global warming, as well as the frequency and severity of extreme weather in recent decades, these potential risks are expected to increase (Hsu & Sharma, 2021). As the number of disaster occurrences is concerning, the tourism industry has been threatened by a series of natural disasters that resulted in a major disruption to the sector (Nguyen *et al*., 2022; Filimonau & de Coteau, 2019; Chan *et al*., 2020; Bird & Gísladóttir, 2020).

Natural disasters can be characterized as severe meteorological phenomena that frequently occur without sufficient forewarning, resulting in substantial devastation encompassing economic ramifications and loss of human life (Craig, 2019). The United Nations (2006) further classified natural disasters into three types: hydro-meteorological disasters (e.g., floods, storms, droughts, and extreme temperature-related disasters including wildfires), geophysical disasters (e.g., volcanic eruptions, earthquakes, and tsunamis), and biological disasters (e.g., epidemics and insect infestations). As concern over natural disasters grows, it is critical to ensure that NBT destinations have effective disaster preparedness strategies. The strategies should incorporate various levels of stakeholders, which encompass the governmental organizations, industry bodies, and nature-based tourism operators that are directly involved in the development, administration, and operation of nature-based tourist sites and activities (Chan *et al.*, 2020; Dunning, 2020; Dunning, 2021). Policymakers use rules and regulations to create the foundation for a safe, sustainable, and ethical NBT development (Fabeil *et al*., 2018; Hughey & Becken, 2016), whereas industry players and operators at the forefront of tourist engagement actively influence visitor experiences and implement sustainable practices (Mushawemhuka *et al*., 2018). By working together, both policymakers and industry players can ensure a sustainable NBT industry that protects natural environments, fosters positive visitor experiences, and contributes to local communities.

Despite its importance, it is still unclear how much academic attention has been given to this topic. This comprehensive and systematic literature review aims to provide insight into the trends and research landscape of NBT governance practiced by various stakeholders in addressing disaster preparedness. Using frequency analysis, we examine patterns in a variety of areas; (1) years of publication to monitor the development of research interest in NBT disaster preparedness, (2) the most commonly used research method to explore preparedness measures, (3) type of disasters focused on in the literature, (4) limitations of studies and, (5) the balance of studies between local agencies or policymakers and nature-based operators. Investigating the scientific trend of this topic may open new opportunities for future research related to natural disasters in NBT.

MATERIALS AND METHODS

The current review employs systematic search criteria to identify and select pertinent studies, thereby reducing the likelihood of reviewer bias and ensuring data consistency and replicability (Collins & Fauser, 2005). Adhering to established guidelines enhances methodological transparency and ensures alignment with best practices (Haddaway *et al*., 2018). To conduct a systematic literature review, this investigation followed the PSALSAR framework as established by Mengist *et al.* (2020) (Table 1). The research process begins with the development of a research protocol that outlines the scope of the study (Figure 1). This is followed by a search conducted using predetermined criteria for identifying and excluding literature, as well as assessing its quality. Synthesis occurs through the extraction and categorization of data. The analysis concludes with the presentation of a narrative of the findings. Lastly, the reporting phase entails describing the methodology utilized and disseminating the results.

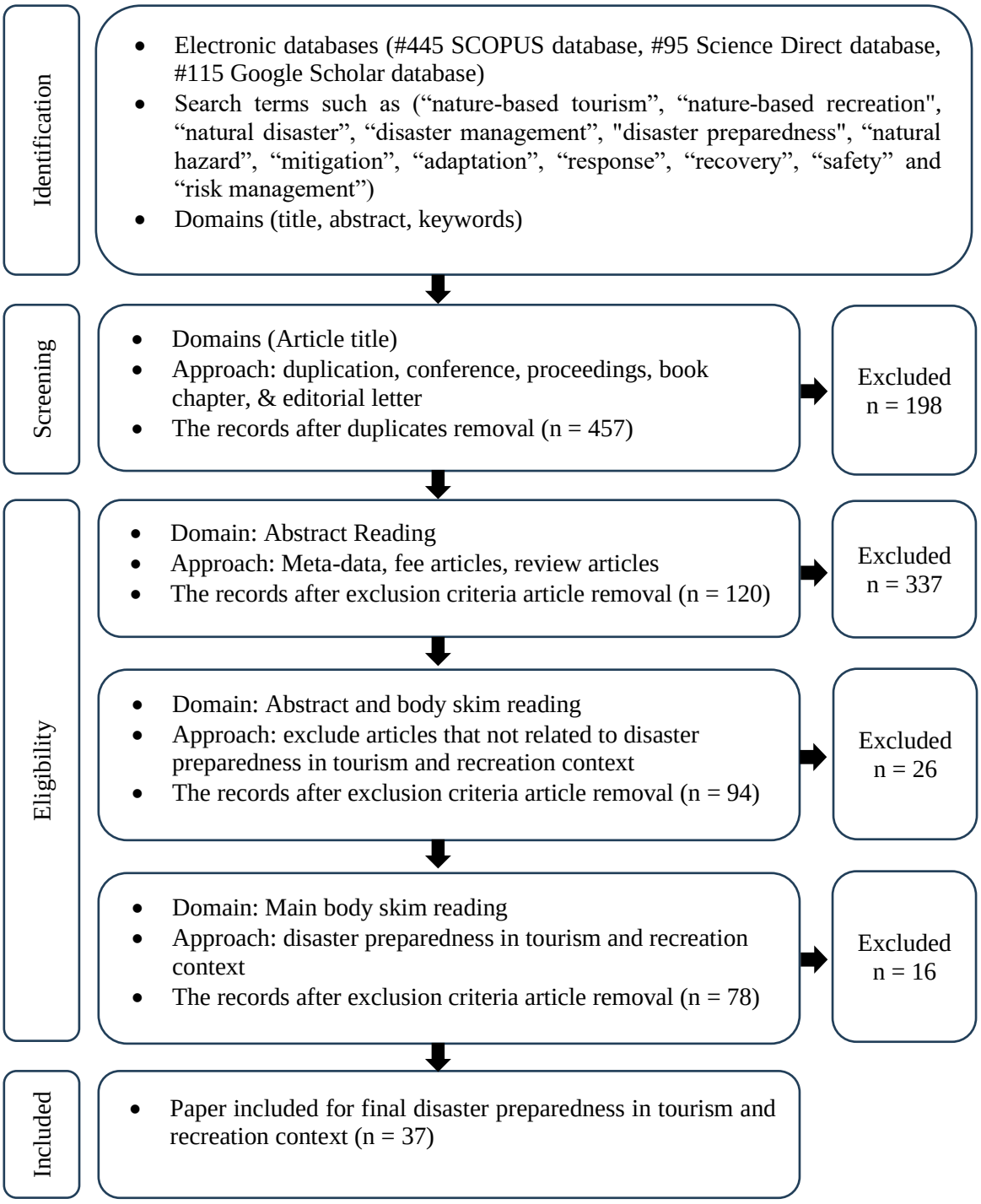

Figure 1. The flow diagram for database search of publications for systematic reviews (Source: Modified from Moher *et al*. (2010) and Mengist *et al*. (2020)).

Table 1. The framework of systematic analysis.

	Steps	Outcomes	Methods
PSALSAR Framework	Protocol	Defined study scope	
	Search	Define the study search strategy	Searching strings
	Appraisal	Selecting studies	Defining inclusion and exclusion criteria
	Synthesis	Extract data Categorize the data	Extraction template Categorize the data on the iterative definition and prepare it for further analysis work
	Analysis	Data analysis	Quantitative categories, description, and narrative analysis of the organized data
		Result and discussion	Based on the analysis, show the trends, identify the gap, and the result comparison
		Conclusion	Deriving conclusions and recommendations
	Report	Report Writing Journal Article production	PRISMA methodology Summarizing the report results for the larger public

Research Scopes

To ascertain the scope of the research, this literature review employed the Population, Interest, and Context (PICo) framework to formulate the research inquiries, as emphasized in Table 2. By focusing on the topic of natural disasters, the literature review considered stakeholders in the nature-based tourism industry as the target population. A distinct characteristic of this study is its focus on existing knowledge in disaster preparedness research. The SLR was used to examine the frequency of studies published on this topic across various governance stakeholder groups and research methods.

Table 2. SLR research scope based on the application of the PICo framework to the defined objectives.

Population	What are the characteristics of the population? What is the condition of interest?	Governance stakeholders of nature-based tourism
Interest	The phenomena of interest relate to a defined event, activity, experience, or process	Natural disasters
Context	The setting or distinct characteristics	Existing knowledge in disaster preparedness studies

Literature Searching Strategy

A comprehensive literature search was conducted as the second step in performing a systematic review. A search strategy refers to a systematic approach to gathering evidence for a review. This process requires the creation of search terms, selection of sources (including databases), and identification of relevant keywords (Petticrew & Roberts, 2006). For the present study, searches were conducted using electronic databases such as SCOPUS, ScienceDirect, and Google Scholar. These databases were selected for their reliability and frequent updates, making them highly

relevant for this review (Zhu *et al*., 2020; Xiao & Watson, 2019). Following the PICo framework, the specification of the search strings reflects the terminology aligned with the target population in the systematic literature review application. Specifically, Table 3 illustrates examples of the search string applied.

Table 3. Search string syntax.

Database	Search String Syntax
SCOPUS	TITLE-ABS-KEY (("nature-based tourism") OR ("nature-based recreation") OR ("nature based tourism") AND ("natural disaster") OR ("disaster management") OR ("disaster preparedness") OR ("natural hazard") OR ("hazard management") OR ("safety") OR ("risk management"))
Science Direct	nature-based and natural disaster
Google Scholar	(nature-based tourism OR recreation) AND (disaster management OR preparedness OR mitigation OR adaptation OR response OR resilience OR recovery)

The search terms were entered either individually or in limited combinations, depending on the limitations or requirements of each database used. Articles limited to abstracts that were not accessible in full text were excluded from the subsequent systematic review. The articles were published in peer-reviewed journals between 2006 and 2023, and the search was conducted from January to October 22, 2023.

Articles Assessment

The selected articles were assessed in alignment with the review's objectives during the appraisal phase. In this process, the titles, abstracts, and full texts of all articles were thoroughly examined to ensure they met the inclusion criteria and were appropriate for further analysis. The inclusion and exclusion criteria are explained in Table 4.

Extensive abstracts, keynote addresses, presentations, conceptual papers, review articles, and papers written in a language other than English were excluded. Inaccessible papers and duplicated documents were eliminated from the final selection. Figure 1 depicts the overall screening procedures and the sequential progression of selecting relevant literature. A total of 655 records were initially acquired; 115 were retrieved from Google Scholar, 95 from Science Direct, and 445 from Scopus. After excluding extended abstracts, presentations, keynotes, book chapters, non-English language papers, and inaccessible publications, the number of records retained for title screening was reduced to 457. Following the appraisal stage, 120 articles met the criteria for abstract screening. After carefully reviewing the abstracts, 94 articles were selected for full-text examination. Among these, 78 articles assessed disaster preparedness within the context of tourism and recreation. Further screening was conducted before downloading these articles. During the main body reading, duplicate papers and those lacking empirical data, not pertaining to nature-based tourism, or not addressing disaster preparedness, were manually removed. As a result, 37 publications met every inclusion criterion.

The 37 articles then underwent quality assessment based on three elements: (i) the inclusion and exclusion criteria were clearly defined and appropriate; (ii) the literature search likely captured all significant studies of the subject matter; and (iii) the studies were published in journals that use single-blind or double-blind peer review. All 37 publications satisfied the inclusion criteria, were peer-reviewed, and focused on disaster preparedness in nature-based tourism involving diverse stakeholders. These articles were then included in the final stage of analysis.

Table 4. Inclusion and exclusion criteria for the articles' assessment.

Criterion	Eligibility	Exclusion
Literature Type	Peer-reviewed empirical journal articles	Review articles, books, book chapters, conference proceedings, conceptual papers, abstracts, presentations, and keynotes
Language	Articles published in English	Articles published in languages other than English
Keyword Relevance	Articles that contain the specified keywords in the title, abstract, or keyword section	Articles that do not contain the specified keywords in any of the key searchable fields
Publication Type	Studies published in peer-reviewed scientific journals	Non-peer-reviewed publications
Topical Relevance	Studies that provide evidence on disaster management in nature-based tourism (NBT)	Studies that do not focus on disaster management or are unrelated to NBT
Stakeholder Focus	Articles that examine at least one NBT governance stakeholder group (e.g., policymakers, operators)	Articles that do not mention or analyze any governance stakeholders in NBT
Publication Date	Articles published from 2006 onward	Articles published before 2006
Originality	Original, primary research studies	Duplicate articles or secondary analyses
Literature Type	Peer-reviewed empirical journal articles	Review articles, books, book chapters, conference proceedings, conceptual papers, abstracts, presentations, and keynotes
Language	Articles published in English	Articles published in languages other than English

Synthesis

The synthesis phase involved systematically retrieving and classifying relevant information from the selected articles to derive conclusions and gain knowledge. Data from each selected paper was extracted and imported into Atlas.ti version 9 for processing. During the categorization phase, the extracted data were organized and classified in preparation for further analysis.

Analysis

Throughout the analysis phase, all relevant information was systematically examined. The process began with frequency statistics, providing an overview of the characteristics of the 37 articles. Evaluation criteria included publication year, research methodology, and stakeholder involvement. Building upon the preliminary frequency analysis, an additional examination was conducted to investigate the specific indicators employed in the studies and the rationales behind the interpretation of the data.

RESULTS AND DISCUSSIONS

This section presents the key findings from the systematic literature review of 37 articles that examined disaster preparedness practices in nature-based tourism (NBT) from the perspective of governance stakeholders. The data were consolidated according to publication year, research methods, and categories of governance stakeholders. Overall, the number of articles included in the review increased from 2006 to 2022 (Figure 2). The minimal number of publications in 2023 is attributed to the ongoing review and publication process. This trend suggests a growing academic interest in disaster preparedness and adaptation in nature-based tourism over the past two decades.

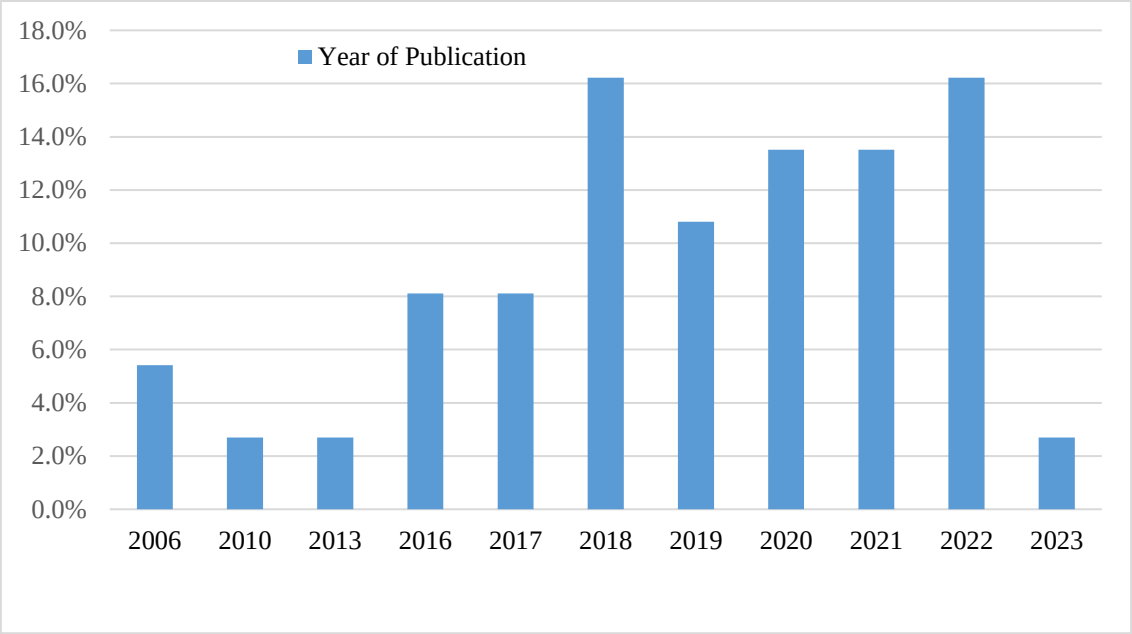

Figure 2. Number of publications by year.

This study found that the most employed research techniques to explore how nature-based tourism (NBT) can prepare for and adapt to disasters were qualitative methods, accounting for about 40%, followed by quantitative methods, with the remaining classified as mixed methods, as shown in Figure 3. The qualitative method was the most commonly used research approach (Chan *et al*., 2020; Dunning, 2020; Dunning, 2021; Van der Veeken *et al*., 2016; Jamaliah & Powell, 2017; Tervo-Kankare *et al*., 2020; Kutzner, 2019; Horne *et al*., 2018; Mushawemhuka *et al*., 2018; Murray & Watson, 2019; Fabeil *et al*., 2018; Whitworth & May, 2006; Fountain & Cradock-Henry, 2020; Jones, 2016; Antonsen *et al*., 2022). Qualitative research employs inductive designs to investigate subjects and gain insights into the processes by which individuals construct meaning and describe their experiences (Leavy, 2017).

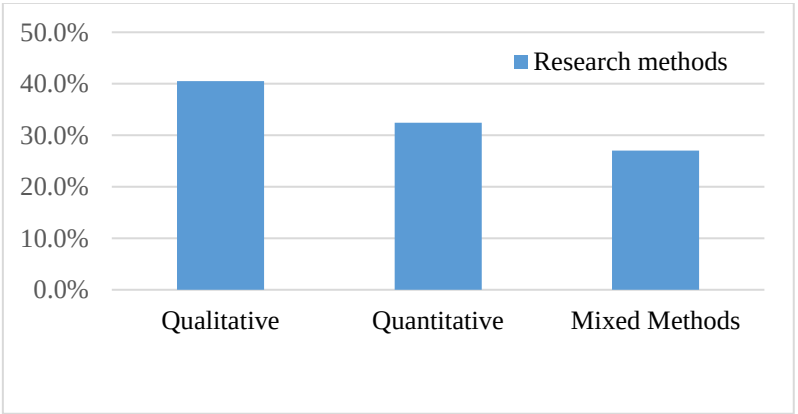

Figure 3. Frequency of research methods employed.

In this SLR, qualitative studies emphasized understanding the viewpoints, perceptions, and experiences of stakeholders engaged in disaster preparedness in NBT. Most studies employed individual interviews applying either semi-structured or structured formats (Chan *et al*., 2020; Dunning, 2020; Dunning, 2021; Van der Veeken *et al*., 2016; Jamaliah & Powell, 2017; Tervo-Kankare *et al*., 2020; Kutzner, 2019; Mushawemhuka *et al*., 2018; Murray & Watson, 2019; Fabeil *et al*., 2018; Fountain & Cradock-Henry, 2020; Jones, 2016; Antonsen *et al*., 2022). Several studies also used focus group discussions to gain collective insights among stakeholder groups (Horne *et al*., 2018; Mushawemhuka *et al*., 2018; Van der Veeken *et al*., 2016; Whitworth & May, 2006;

Fountain & Cradock-Henry, 2020; Antonsen *et al*., 2022). Additionally, content analysis of governance-related documents such as reports, planning materials, directories, and official records was generally used to support interview data (Jones, 2016; Fountain & Cradock-Henry, 2020; Kutzner, 2019; Van der Veeken *et al*., 2016; Dunning, 2020). These studies relied on primary and secondary data to ensure a balanced and valid understanding of NBT disaster preparedness. Depending on the study objectives, interview-based studies involved between 9 and 80 participants, while focus group discussions included 9 to 19 participants.

On the other hand, quantitative research uses numerical data collection techniques to identify trends, measure impacts, and evaluate the effectiveness of preparedness strategies. Secondary data analysis was the most used approach, with studies drawing from existing datasets related to meteorological conditions, visitor statistics, or the economic impacts of disasters (Ma *et al*., 2020b; Ma *et al*., 2021; Craig, 2019; Coldrey & Turpie, 2020; Liu *et al*., 2021; Fitchett & Meyer, 2023; Ma *et al*., 2020a; Craig *et al*., 2021). While sample size was not a direct determinant in this context, these analyses depended on the temporal coverage and quality of the available data. Surveys were another method used in quantitative studies, involving NBT operators and visitors. These studies typically utilized large numbers of participants, ranging from 250 to 2400 samples (Fountain & Cradock-Henry, 2020; Liu *et al*., 2021; Craig *et al*., 2021). Other studies implemented mixed-method research approaches, combining both quantitative and qualitative designs to integrate deductive and inductive perspectives (Leavy, 2017). These approaches provided a more holistic understanding of disaster preparedness in NBT contexts (Dube & Nhamo, 2020a; Ngxongo, 2021; Bitsura-Meszaros *et al*., 2019; Bird & Gísladóttir, 2020; Dube & Nhamo, 2020b; Jedd *et al*., 2017; Mushawemhuka *et al*., 2022; Pyke *et al*., 2016; Cuirong, 2016; Dahan *et al*., 2010). These studies often triangulated interview data with surveys and secondary sources such as weather data, geographic information systems (GIS), and economic indicators.

The impact of natural disasters on NBT has been identified in the reviewed articles, with most of the studies, 67.6%, focused on climate-related disasters (drought, flood, wildfire, hurricane, and extreme temperature) (Figure 4). In contrast, 32.4% of studies on non-climate disasters (earthquake, forest fire, landslide, and volcanic eruption) related to NBT cover the remainder of the investigation from the literature. Based on the statistics, most of the research on NBT placed a strong emphasis on climate-related disasters, such as heat waves, droughts, floods, wildfires, and hurricanes, while overlooking studies on non-climate disasters.

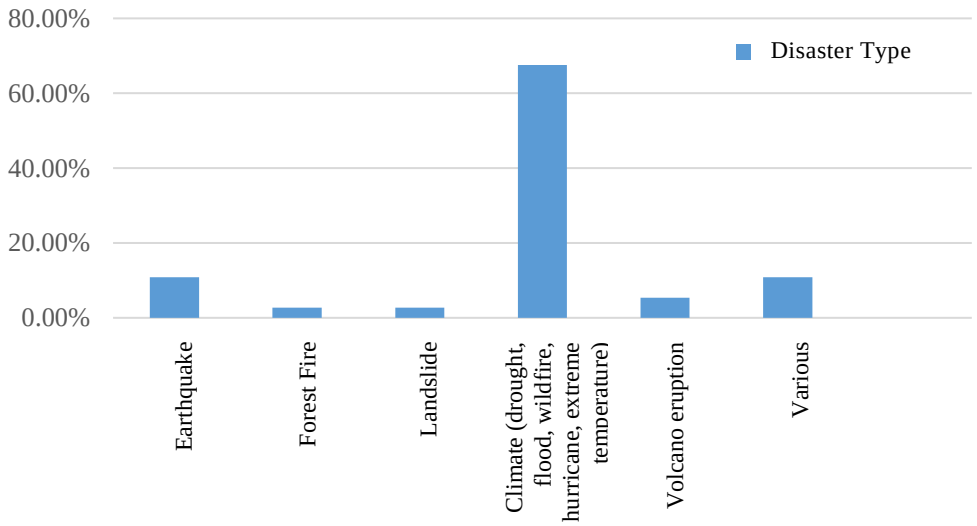

Figure 4. Statistics by type of disaster.

These findings support the evidence from the Global Risk Landscape map (World Economic Forum, 2024), which emphasized the critical threats of climate-related disasters, especially extreme weather events with high cascading effects. Non-weather-related natural disasters demonstrate a lower perceived influence compared to climate-related hazards. This trend supports current scholarly arguments that non-climate disasters are underrepresented in global disaster preparedness and tourism research, partly due to their geographical specificity and reduced perceived generalizability (Overland & Sovacool, 2020; Rossello *et al*., 2020). Accordingly, research on climate-related disasters has been emphasized in recent years, largely to address the global escalation of extreme weather events and thus demand urgent scholarly and policy attention.

Another key finding from the review focuses on the research limitations identified by the studies. Most articles highlighted common challenges in conducting research on disaster preparedness in nature-based tourism (Figure 5). Among these, data availability and quality appeared as a central concern, especially in studies on climate and weather-related disasters. This limitation is widely emphasized because accurate and complex data are essential for reliable analysis in this field. A significant portion of these challenges stems from the lack of access to and the quality of secondary data focused on meteorological and operational records. Researchers do not have enough capacity to retrieve extensive and available meteorological data, and most agencies do not consistently apply practices to record or share their operational data. It is crucial to strategize data retrieval that can enhance the quality of data analysis. For example, Coldrey and Turpie (2020) opted to use Climate Research Unit (CRU) data compared to the South African Weather Service (SAWS) due to its advantages in accessibility, consistency, quality, and wide-ranging coverage, which contribute to conducting in-depth and reliable research. Consequently, this limitation also impacts generalizability and transferability, as underscored by most of the literature. Similarly, the specific scope of geographical focus and context-specific nature contribute significantly to impacting generalizability and transferability. To improve generalizability, future research should aim to include a broad range of regions, climates, and sectors. Cross-regional and cross-sectoral research would provide more comprehensive and universally applicable findings.

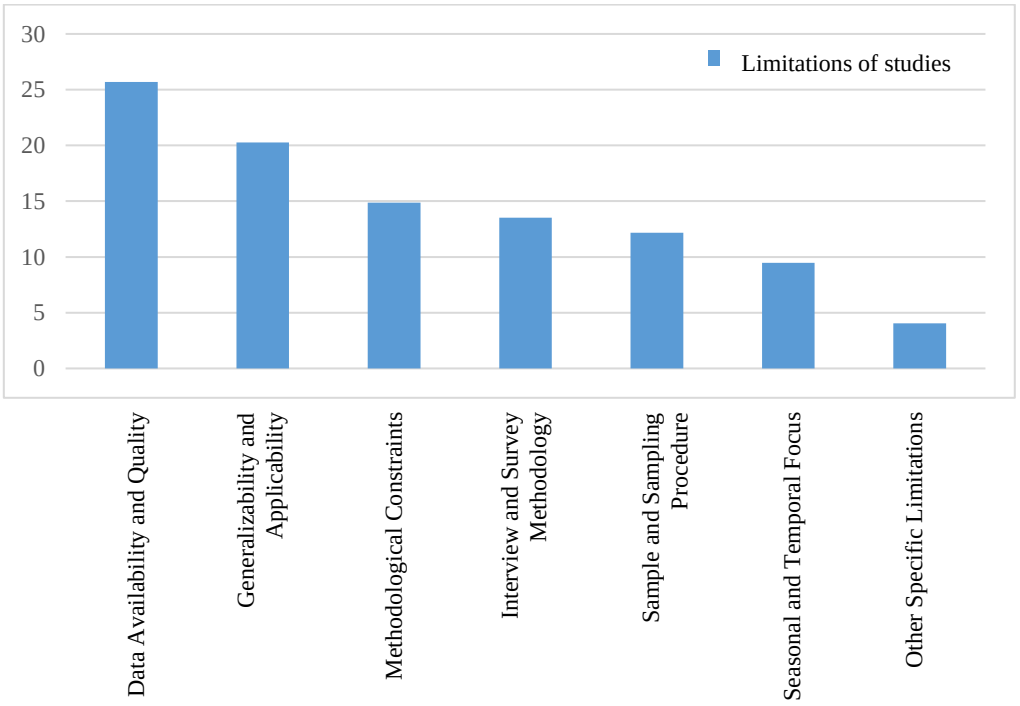

Figure 5. Statistics by type of limitations in NBT and disaster studies.

Other common problems in conducting the studies are identified in the literature, such as limited sample and sampling procedure (Murray & Watson, 2019; Ngxongo, 2016; Fountain & Cradock-Henry, 2020; Bitsura-Meszaros *et al*., 2019; Chan *et al*., 2020), methodological constraints (Ngxongo, 2016; Chan *et al*., 2020; Coldrey & Turpie, 2020; Jamaliah &Powell, 2017), and interview and survey methodology (Craig *et al*., 2021; Fabeil *et al*., 2021; de Uriost e-Stone *et al*., 2015; Chan *et al*., 2020; Bird & Gísladóttir, 2020; Jamaliah & Powell, 2017; Antonsen *et al*., 2022; Fountain & Cradock-Henry, 2020; Dahan *et al*., 2010), which underscores the importance of methodological innovation. Seasonal and temporal limitations were identified, especially in studies with short or fixed data collection periods that do not account for seasonal climate variability (de Urioste-Stone *et al*., 2015; Tervo-Kankare *et al*., 2017; Craig *et al*., 2021; Antonsen *et al*., 2022; Jedd *et al*., 2017; Craig & Feng, 2018)

Governance stakeholders, including policymakers, governmental agencies, industry institutions, and NBT businesses, play a critical role in tourism disaster management (Figure 6). The role of governmental agencies is emphasized through the implementation of policies and coordination of disaster response initiatives, while policymakers are responsible for establishing regulatory frameworks that guide disaster management efforts (Ritchie, 2004; Becken & Hughey, 2013; Dunning, 2020; Dunning, 2021). The findings elaborate on the types of NBT governance stakeholders studied in disaster preparedness. NBT operators receive more attention in the literature compared to policymakers. The critical role of NBT operators is highlighted in disaster preparation, response, and recovery, as they are directly affected by disasters and are crucial to both immediate and long-term recovery. During disasters, operators provide emergency accommodations, communication, and information (Chan *et al*., 2020; Bird & Gísladóttir, 2020; Whitworth & May, 2006), especially to ensure the safety of visitors (Fountain & Cradock-Henry, 2020; Craig *et al*., 2021; Ngxongo, 2021). During the long-term recovery and resolution phases of disaster management, the tourism industry's contributions are more fundamental, as they differ across various phases (Chan *et al*., 2020). In conclusion, nature-based tourism studies concentrate on operators due to their direct impact on disasters, their responsibility for instituting preparedness measures, and their critical role in the immediate response and long-term recovery of the tourism sector. Their direct experiences, operational data, and practical insights provide a comprehensive understanding of disaster impacts and management, making them essential for effective disaster preparedness research.

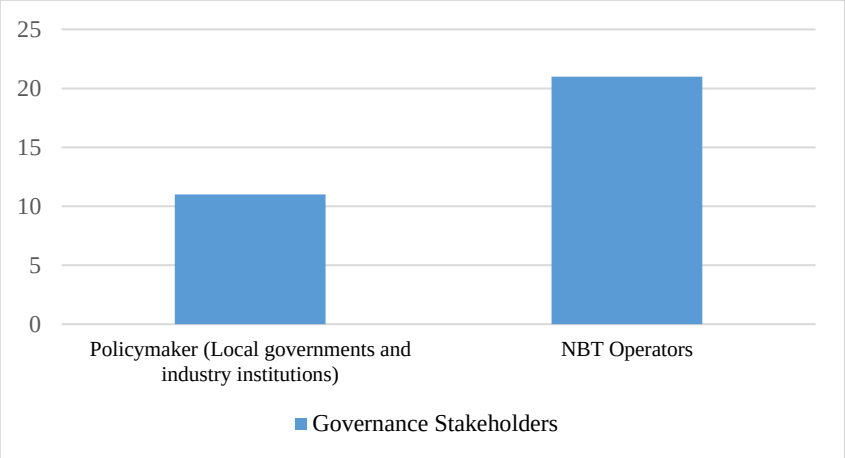

Figure 6. Statistics by category of governance stakeholders

A few determining factors are emphasized regarding the preparedness level of NBT operators, as noted in the literature. Most studies confirm that organizational and background profiles are important factors in preparedness measures. For example, the size of organizations

(Hystad & Keller, 2017; Kutzner, 2019; Murray & Watson, 2019; Fabeil *et al*., 2018), organizational income (Orchiston, 2013; Murray & Watson, 2019; Fabeil *et al*., 2018), and experience with disaster occurrences (Orchiston, 2013; Kutzner, 2019) contribute to disaster preparedness capabilities. These studies highlight how larger organizations, higher income, and experience with disasters lead to better preparedness measures. However, other determining factors should be evaluated to better explore the capability and capacity of disaster preparedness, such as the degree of an organization's exposure to disaster risks and the availability of resources for preparedness efforts.

Findings on NBT operators also reveal discrepancies between the perceived significance and actual performance of disaster management attributes. This is due to insufficient remedial actions (Mushawemhuka *et al*., 2018; Hystad & Keller, 2006; Fabeil *et al*., 2018; Orchiston, 2013; Kutzner, 2019), low self-efficacy (Horne *et al*., 2018), optimism bias (Tervo-Kankare *et al*., 2017), lack of awareness (Jamaliah & Powell, 2017), and a reactive mindset (Dahan *et al*., 2010; Hystad & Keller, 2006). Researchers recommend implementing more comprehensive, systematic strategies for tourism disaster management, such as community-led planning initiatives and incorporating knowledge from various fields to overcome these obstacles (Ritchie, 2008; Orchiston, 2013).

Studies on policymakers (i.e., local government and industry institutions) show an increasing awareness of their role in influencing disaster preparedness within NBT, even though they have received less focus in most studies. Most studies concentrate on risk perceptions and actions taken to reduce the impact of disasters at destinations as a responsibility of local governments and industry institutions (Hystad & Keller, 2006; Chan *et al*., 2020; Dube & Nhamo, 2020a; Antonsen *et al*., 2022; Ngxongo, 2021; Bitsura-Meszaros *et al*., 2019; Bird & Gísladóttir, 2020; Fountain & Cradock-Henry, 2020; Jones, 2016). This distribution highlights the potential for improvement in the gaps between practice and policy. The role of policymakers in NBT disaster preparedness is growing, but studies focusing on policy effectiveness are scarce concerning how their frameworks affect NBT operators' preparedness measures. For example, Dunning (2020), Dunning (2021), Van der Veeken *et al*. (2016), and Mushawemhuka *et al*. (2018) noted the burdensome nature of policies affecting operators' preparedness measures for disasters, which should be explored further in future research. Further studies may examine ways to better customize policy so that operators have the resources and tools needed to successfully reduce disaster risk. This could include ensuring that policies are understandable and implementable and that NBT operators have access to funding or training courses. By promoting closer collaboration between NBT operators and policymakers, the NBT industry can effectively bridge this gap and develop a more comprehensive approach to disaster preparedness.

CONCLUSION

This systematic research examined the trends and research landscape of governance stakeholders in nature-based tourism (NBT) preparedness for disasters. This study found that during the past two decades, there has been a notable increase in publications, indicating a growing interest in this field. The study emphasizes the importance of understanding stakeholder perspectives on preparedness by using various research methods, including qualitative techniques such as focus groups and interviews, as well as quantitative and mixed methods approaches, which yield useful data for identifying trends and quantifying impacts. Most research focused on NBT has emphasized climate-related disasters, such as heat waves, droughts, floods, wildfires, and hurricanes, while studies on non-climate disasters have been underrepresented. This is significantly evidenced by the World Economic Forum (2024) regarding the major focus on global critical threats, particularly extreme weather events, while non-weather-related natural disaster risks receive less emphasis, partly due to geographical specificity and perceived reduced generalizability. Therefore, it is not surprising that most existing research and policy discussions have drawn significant attention to climate-related disasters, which have heightened visibility and perceived urgency, thus underrepresenting non-climate disasters in nature-based tourism and disaster preparedness literature. This gap, driven

by regional specificity and reduced generalizability, leads to a need for more inclusive research and preparedness strategies among governance stakeholders in nature-based tourism contexts.

In the study's limitations, most literature highlighted data availability and quality as the primary limitation, mainly challenging the retrieval of secondary data such as meteorological and operational data. Common limitations noted in the studies include generalizability and applicability, limited sample size and sampling procedures, methodological constraints, interview and survey methodology, as well as seasonal, temporal, and specific limitations to certain studies. Most research examines how NBT operators operate, emphasizing the importance of comprehending their unique direct experiences, operational data, and practical insights in providing a comprehensive understanding of disaster impacts and management, making them essential for effective disaster preparedness research.

Studies involving policymakers are becoming less frequently reported, but they reflect a growing understanding of their importance in creating a framework that supports NBT disaster preparedness. This trend raises the possibility of improvement between practice and policy. Future studies should explore how to better tailor policy frameworks so that NBT operators have the necessary resources and tools to effectively reduce disaster risks. In summary, the systematic literature review findings establish a strong foundation for enhancing the quality, scope, and impact of future research on NBT disaster preparedness among governance stakeholders. Future research can contribute to a more comprehensive understanding of disaster preparedness in the context of nature-based tourism by addressing identified gaps and limitations in studies and focusing on underrepresented disaster types and stakeholders.

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