Chapter 3
What Is the Importance of Wetlands in Reducing Disaster Risks?
What Do Scientific Reports Tell Us?

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ABSTRACT

This chapter provides a bibliometric analysis of 960 scientific publications from 1978 to 2024, focusing on the connection between wetlands and disaster risk reduction. The study highlights the sharp growth of research in recent decades, underlining wetlands' essential roles in flood mitigation, climate regulation, and the provision of ecosystem services. It identifies major trends such as the use of remote sensing technologies, the integration of climate adaptation strategies, and the need for interdisciplinary collaboration. The findings emphasize the importance of including wetlands in policy frameworks, advancing restoration practices, and promoting stakeholder participation. Overall, the chapter concludes that wetlands are vital natural assets that enhance resilience and sustainability, offering valuable insights for shaping future research, policy, and practical action.

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1. INTRODUCTION

Disasters are often destructive events that test the resilience of human societies and natural ecosystems (Smith and Petley, 2009; Walz et al., 2021). These events include recurring and extreme natural disasters related to earthquakes, floods (Ferreira et al., 2023), droughts (De Feudis et al., 2024), heat waves, tropical cyclones, volcanic eruptions, and earthquakes. Beyond floods and coastal hazards, wetlands are also relevant in multi-hazard and compound-risk settings. For example, drought–heat interactions can intensify ecological stress and water scarcity in wetland-dependent landscapes, while wildfire risk is particularly salient for peatlands, where drying and burning can create cascading impacts through carbon emissions, smoke, infrastructure disruption, and livelihood losses. These compound and cascading dynamics underscore that wetland–DRR linkages should be assessed across alternating and interacting hazards (e.g., drought followed by flooding), not only single-event flood protection. Every year, we witness striking similarities in the images of losses and destruction caused by disasters. Disasters consistently undermine local and national development efforts, disrupting efforts to support livelihoods, promote economic growth, and ensure overall human well-being (Cutter et al., 2003). Additionally, ecosystem losses during these disasters are generally not reported (Walz et al., 2021). This lack of reporting can lead to an underestimation of the long-term ecological impacts, which may, in turn, reduce the effectiveness of post-disaster recovery strategies and policies (Kehoe et al., 2017; Turetsky et al., 2015; Zscheischler et al., 2018).

Understanding and coping with the effects of disasters requires focusing on the harmonious functioning of ecosystems with nature (Graveline and Germain, 2022). The relationship between disaster management and wetlands is a complex and vital issue that requires in-depth examination from both ecological and social perspectives (Moomaw et al., 2018). In this context, natural ecosystems like wetlands play a critical role in both mitigating the effects of disasters and increasing community resilience (Sutton-Grier and Sandifer 2019). Wetlands, by enhancing ecosystem services such as water purification, groundwater recharge, and climate regulation, provide not only direct protection but also co-benefits that contribute to overall environmental health and disaster risk reduction (Gardner and Finlayson, 2018; Davidson et al., 2019).

Wetlands act as a natural buffer with functions such as water diversion, flood control, and carbon storage (Costanza et al., 1997). Additionally, these ecosystems contribute to environmental stability by providing a significant habitat for biodiversity (Mitsch and Gosselink, 2000). With these characteristics, wetlands are considered an integral part of disaster management strategies. Understanding the benefits these services provide to human communities in disaster situations is of