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## EDITORIAL OPEN ACCESS

# Social Innovations and Transformations in Flood Risk Management

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Accepted: 16 January 2025

Flood risk management has changed significantly over the past decades (Kuhlicke et al. 2020). The focus has shifted from flood protection to flood risk management also with the consequence to change the relationship and arrangement between state and nonstate actors (Hartmann and Juepner 2014; Hartmann and Driessen 2017). Flood protection embraces a hazard-based perspective that relies primarily on engineering solutions. It is driven by expert-based and top-down decision-making. Flood risk management include a broader more holistic perspective of dealing with floods, including stronger involvement of nonstate actors (Adger et al. 2013; Hartmann and Driessen 2017; Kuhlicke et al. 2020). A core aim of flood risk management is also to encourage bottom-up innovative solutions for managing flood hazards (Thaler, Attems, and Fuchs 2022; Birkmann et al. 2023; Junger et al. 2023). Nevertheless, the selection process of flood risk management strategies still places a strong emphasis on technical mitigation measures. A significant barrier remains the preference within flood risk management for established and reliable methods over more experimental approaches that could potentially achieve broader objectives. In addition to conventional technical measures, which are often capital-intensive and can lead to environmental degradation, there is a growing need for innovative solutions that can not only effectively reduce flood risks, but also contribute to nature conservation, climate change mitigation, sustainable natural resource management, and the successful implementation of the European Water Framework Directive and the Floods Directive. Moreover, these innovations should aim to deliver societal co-benefits, such as improved quality of life and well-being. However, the success of these innovative concepts depends on social innovations that can drive a societal transformation process.

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The concept social innovation has been introduced a long time ago with the aim to overcome lock-in situations and to provide "better" responses to ongoing societal problems, such as managing the housing crises, encouraging our society toward decarbonization, selecting and implementing climate adaptation strategies, dealing other national and international crises and so forth (Hamdouch and Nyseth 2023). The core point of social innovation is the encouragement of social change, including a collective decision-making process. Put differently, social innovation can be understood as a way in which people are aiming at establishing new and more effective answers to the challenges that societies face, while at the same time embedding these solutions in a way that address societal needs (and not only steered towards economic profit). In this way, social innovation puts a greater emphasis compared to other types of innovation on values attached to products, including improving relationships, establishing new forms of cooperation, collaboration, and knowledge sharing. In particular, the concept of social innovation acts a counterresponse to the neoliberalism perspective on innovation and its potentially negative consequences for our society, such as privatization. Consequently, social innovation is also seen as a tool to encourage more democratic processes within political decision-making (Metzger, Allmendinger, and Oosterlynck 2014). Therefore, a core focus of social innovation lies in the support of the citizens to participate within political processes, which can eventually also encourage societal transformation process (Meyer and Hartmann 2025).

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## 1 | Role of Social Innovation in Flood Risk Management

This special issue presents various examples of how social innovation is understood and applied in flood risk management. The contributions show how social innovation plays an increasingly important critical role in this field, especially in light of the ongoing behavioral shift that raises important questions about how to organize and legitimize new relationships between state and nonstate actors in flood risk management (Kuhlicke et al. 2020; Vinke-de Kruijf, Groefsema, and Snel 2025). The special issue also addresses the challenge of developing and implementing innovative solutions to respond effectively to flood hazards. The eight papers in this special issue explore different approaches to managing the risks associated with flooding through the lens of social innovation. These approaches range from the role of spontaneous volunteers in emergency management (Bier et al. 2025), to encouraging individual adaptation (Meyer and Hartmann 2025) as well as to the development of early warning systems (Canwat 2025) and the implementation of polders (Warachowska et al. 2025).

One crucial factor in enabling social innovation is ensuring that the necessary resources are available to all stakeholders involved. Citizens need to be aware of the challenges of flood risk management, including planning, decision-making, and the implementation of risk reduction measures, as demonstrated by Kelly and Kelly (2025). Additionally, flood engineers need to learn new skills and adapt to evolving roles (Thaler and Levin-Keitel 2016; Vinke-de Kruijf, Groefsema, and Snel 2025). Institutional settings also need to be adaptable to facilitate these changes (Cook et al. 2025). Vinke-de Kruijf, Groefsema, and Snel (2025) highlight that flood risk management has become a balancing act that involves determining how broadly and under which conditions citizens are engaged, how flexible the decisionmaking process is, the exploration of new funding schemes, and consideration of time horizons for risk reduction measures. This complexity results in a more diverse but also more resourceintensive flood risk management process, which can also support a broader transformation process (Scolobig et al. 2023).

The necessity for social innovation in realizing innovative concepts is clearly demonstrated by Warachowska et al. (2025), who show how social innovation is essential for the implementation of polders in Poland and Hungary. The creation of polders often involves significant political challenges since these measures must be implemented on privately owned land. At the same time, polders can offer opportunities for co-benefits such as carbon storage and improved biodiversity. Their implementation requires new arrangements and modes of collaboration among different stakeholders. Social innovations are crucial for enabling these changes, yet the lack of a supportive institutional framework can significantly hinder progress. Moreover, fostering social innovation requires not only changes to the legal framework but also creating space for learning processes, particularly through experimental learning. This is essential for developing innovative visions, as highlighted by O'Donnell, Snelling, and Lamond (2025), Kelly and Kelly (2025), and Cook et al. (2025). Encouraging a societal transformation process in flood risk management also demands substantial institutional change. This includes moving away from a purely top-down,

engineering-focused approach to a more inclusive strategy that considers how power can be shared among all stakeholders involved in managing flood risks (Cook et al. 2025).

## 2 | Conclusion—Next Steps to Go

This special issue explores the role of social innovation for flood risk management and of course its implications toward flood risk governance system. We indeed observe an increasing relevance of social innovations in flood risk management. However, it is by no means a mainstream phenomenon. Contributions identify some barriers that hinder the integration of social innovation. One significant obstacle is still the prevalent "classical" understanding of flood risk management of key stakeholders (mainly water authorities). This traditional approach clearly defines responsibilities, organizes the decision-making process, and determines the most suitable risk reduction measures for each flood-prone area. The associated procedural rigidity makes it difficult to facilitate bottom-up initiatives and broader societal engagement in planning, decision-making, and implementation processes. Consequently, social innovation tends to occur more frequently in areas where flood risk management is not as highly institutionalized; "outside" the classical strategies to reduce the potential impacts, such as implementing measures on privatelyowned land like Nature-based Solutions or property level flood risk adaptation (PLFRA) measures among others.

As the different papers in this issue demonstrate, social innovation in flood risk management is possible and has the potential to drive a societal transformation process. Further investigation into the potential role of social innovation in flood risk management is needed in our view, especially to understand the conditions under which it can thrive. This includes exploring new forms of collaboration and considering how innovation also within public administration and how they engage with the wider public might be necessary to enable a broader societal transformation.

#### Data Availability Statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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