


# Recognition of differences in the capacity to deal with floods—A cross-country comparison of flood risk management

Mandy Paauw<sup>1</sup>  | Glen Smith<sup>2</sup> | Ann Crabbé<sup>1</sup> | Marie Fournier<sup>3</sup>  | Johan Munck af Rosenschöld<sup>4</sup> | Sally Priest<sup>2</sup> | Aino Rekola<sup>5</sup>

<sup>1</sup>Centre for Research on Environmental and Social Change (CRESC), Department of Sociology, University of Antwerp, Antwerpen, Belgium

<sup>2</sup>Flood Hazard Research Center (FHRC), Middlesex University, London, UK

<sup>3</sup>École Supérieure des Géomètres et Topographes, Conservatoire National des Arts et Métiers (CNAM), Le Mans, France

<sup>4</sup>Climate Solutions Unit, Finnish Environment Institute (SYKE), Helsinki, Finland

<sup>5</sup>Societal Change Unit, Finnish Environment Institute (SYKE), Helsinki, Finland

## Correspondence

Glen Smith, Flood Hazard Research Center (FHRC), Middlesex University, The Burroughs, Hendon, London NW4 4BT, UK.  
Email: [g.smith@mdx.ac.uk](mailto:g.smith@mdx.ac.uk)

## Funding information

Academy of Finland; UK Research and Innovation; Agence Nationale de la Recherche, ANR-20-SOLS-0003; Belgian Federal Science Policy Office; Economic and Social Research Council, Grant/Award Number: ES/V014021/1

## Abstract

Flood risks worldwide are increasing due to climate change. Managing these risks is ever more necessary. Although flood risk management (FRM) is often understood as a technical challenge, it also involves decisions about the distribution of resources and risks in floods, which can be inherently unfair. People are disparately affected by floods due to their location. Because of their various socioeconomic and demographic characteristics, they also differ in their capacity to deal with floods. These differences need to be recognised in FRM to prevent disproportionate impacts on vulnerable communities. However, at present, a knowledge gap exists on how to make FRM more inclusive and just, and discussions on recognition justice in the context of FRM are scarce. This article therefore examines recognition of differences in the capacity of people to deal with floods in FRM in England (United Kingdom), Finland, Flanders (Belgium) and France. We analyse if, and how, these differences are recognised in FRM policy and practice and through decision-making procedures, drawing on examples from the implementation of five FRM strategies in each country (flood risk prevention, flood defence, flood risk mitigation, flood preparation and flood recovery). Furthermore, we aim to highlight opportunity spaces to strengthen recognition justice in future FRM.

## KEYWORDS

climate change adaptation, environmental justice, floods, flood risk management, (in) equality, recognition justice, vulnerability

## 1 | INTRODUCTION

Climate change is expected to result in sea-level rise and increase the frequency and intensity of extreme precipitation events, causing higher risks of coastal, fluvial and pluvial flooding. These risks are compounded by

population growth, urbanisation and the concentration of people, infrastructure and other assets in flood risk areas (Kabisch et al., 2016; Keskitalo, 2013). Floods are amongst the most common climate-related disasters (Gourevitch et al., 2020). Worldwide, millions of people are threatened by flooding causing loss and damage to

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2024 The Authors. *Journal of Flood Risk Management* published by Chartered Institution of Water and Environmental Management and John Wiley & Sons Ltd.

their lives and livelihoods (Begg, 2018; Ciscar et al., 2011; Hegger et al., 2014; Karrasch et al., 2021; Walker, 2012). These impacts are often unevenly distributed, with vulnerable communities being disproportionately affected (Boyd et al., 2021; Dorkenoo et al., 2022; Mechler & Schinko, 2016; Wyns, 2023). As climate change mitigation efforts are unlikely to prevent floods, adaptation is a necessity.

The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as ‘adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts’ (IPCC, 2001). Essentially, adaptation refers to strategies aimed at reducing risks resulting from climate change (Keller et al., 2021; Kunreuther et al., 2013). Flood risk management (FRM) supports the implementation of such strategies specifically targeted at flood risks (Keskitalo, 2013; Plate, 2002). The European Floods Directive (2007/60/EC) requires member states to address the consequences of floods in addition to their probability, stressing the importance of strategies such as prevention, mitigation and preparedness (Kellens et al., 2013). Research shows that in various countries, strategies are also being implemented in the context of response and recovery (Hegger et al., 2014). In this article, we therefore focus on five FRM strategies to adapt to flood risks: (1) flood risk prevention, (2) flood defence, (3) flood risk mitigation, (4) flood preparation and (5) flood recovery.

FRM is often understood as a technical challenge requiring engineering solutions (Eakin et al., 2021). However, research shows that ‘technically and economically effective FRM can be inherently unfair’ (Johnson et al., 2007, p. 383). FRM focuses on the distribution of resources and risks related to floods, which has important justice implications (Eakin et al., 2021). People are also disparately affected by floods, due to their location and their social, physical, financial or psychological characteristics, which can create inequalities in the capacity of people to deal with flood events, as well as in their capacity to participate in the development and implementation of FRM strategies (Forrest et al., 2020; O’Hare & White, 2018; Thaler et al., 2018). These differences need to be recognised and addressed in FRM to prevent disproportionate impacts of floods on those who are most vulnerable (de Goër de Herve, 2022; Forrest et al., 2020).

Policy is an important instrument to influence societal change (de Goër de Herve, 2022) and provides an opportunity space to address differences in people’s capacity to deal with floods. Ignoring these differences in FRM can undermine its effectiveness and legitimacy, as well as exacerbate or introduce new inequalities in floods (Thaler et al., 2018). As the discussion of recognition in the context of FRM is still relatively new (de Goër de

Herve, 2022) and a knowledge gap exists on how to make FRM more inclusive and just in the future (Matczak & Hegger, 2021), we explore to what extent differences in the capacity of people to deal with floods are currently recognised in national-level FRM in four countries: England (United Kingdom), Finland, Flanders (Belgium) and France, in the context of the five FRM strategies.

## 2 | CONCEPTUALISING JUSTICE IN FRM

### 2.1 | Three dimensions of justice

Adaptation to flood risks does not only have physical and hydrological implications but also impacts socioeconomic systems (Sayers et al., 2013; Thaler & Hartmann, 2016). Flooding is increasingly recognised as an environmental justice issue (Thaler & Hartmann, 2016; Walker & Burningham, 2011). Environmental justice focuses on the fact that poor communities, indigenous communities and communities of colour get fewer environmental goods, more environmental bads, less environmental protection and unequal access to participation (Schlosberg, 2007). A focus on environmental justice is highly relevant for the long-term sustainability of FRM policy (Agyeman, 2013; Penning-Rowsell et al., 2016), as these policies inherently entail decisions about the distribution of environmental goods and bads related to floods (Begg, 2018). Where equality has been defined as a descriptive approach to difference (Forrest et al., 2020), describing the (un)equal or (un)even distribution of decision-making power, resources and risks associated with floods, justice has a normative dimension and analyses whether this distribution is fair (Begg, 2018; Forrest et al., 2020; Thaler & Hartmann, 2016). It is often understood as a characteristic of the impacts of disasters, strategies and schemes or decision-making processes (de Goër de Herve, 2022). In the literature, justice, equity and fairness are often used interchangeably (Hay, 1995). Another related concept, solidarity, can be understood as an application of justice that, in the context of FRM, refers to efforts to protect the most vulnerable from flooding (Alexander et al., 2018; Sayers et al., 2018).

There are different conceptualisations of justice, such as utilitarianism, libertarianism, egalitarianism or Rawlsian (see Kaufmann et al., 2018) that can be dominant within a country, policy or FRM strategy (Thaler & Hartmann, 2016). There are also different dimensions of environmental justice. Two commonly discussed dimensions in the FRM literature are procedural and distributive justice. Procedural justice focuses on the policy choices made and by whom these choices are made, and

on decision-making processes and the extent to which these processes are inclusive (de Goër de Herve, 2022; Schlosberg, 2004). Stakeholder participation is an important element of procedural justice, and it has been argued that participation can reduce inequality in FRM and contribute to distributive justice (Begg, 2018; Schlosberg, 2004). Distributive justice evaluates whether resources and risks associated with floods are fairly distributed (Kaufmann et al., 2018; Schlosberg, 2004). This can include the risk itself, costs for flood prevention and recovery and the distribution of decision-making power. Hence, procedural and distributive justice are linked (de Goër de Herve, 2022).

However, this relationship is not straightforward. Stakeholder involvement does not automatically lead to fair decision outcomes (Begg, 2018; O'Hare & White, 2018). If differences in socioeconomic status, age, ethnicity or other factors that result in a diversity of interests and needs are not acknowledged in decision-making processes, then procedural justice is unlikely to contribute to distributive justice. Martin et al. (2013) therefore argue that environmental justice should also include the dimension of recognition. Recognition justice underlines the need to recognise the diversity of perspectives and experiences, conflicting interests and socio-cultural characteristics that are at the root of injustice in society (de Goër de Herve, 2022; Schlosberg, 2004). It focuses on (dis)respect for differences in individual backgrounds (Thaler, 2021). Recognition is crucial for participation to contribute to fair decision-making processes and outcomes (Paloniemi et al., 2015) because if certain groups or individuals are not recognised as stakeholders in the first place, they are not invited to participate and their needs are likely to be overlooked (Prado, 2022). In other words, recognition serves as a precondition to other dimensions of justice (Bulkeley et al., 2014; Schlosberg, 2004) and is therefore the main focus in this article.

## 2.2 | Differences in the capacity to deal with floods

Recognition justice prescribes that differences in people's identities, experiences and interests should be equally acknowledged and represented in policies and programmes (Whyte, 2011). This is highly relevant for FRM, as someone's capacity to deal with floods is not just determined by their location or exposure to risks, which has often been defined as 'flood vulnerability' (Walker & Burningham, 2011). There are various social, physical, financial and psychological factors that determine how people are affected by floods

(O'Hare & White, 2018; Taylor, 2014; Thaler et al., 2018), including socioeconomic status, age, gender, education, social capital, ethnicity, property type, health and land-ownership (Coninx & Bachus, 2007; Fielding & Burningham, 2005; Foster et al., 2019; Norris et al., 2008; Walker & Burningham, 2011).

If insufficiently recognised, these factors can create inequalities in the capacity of individuals and communities to deal with increasing flood risks (Liverman, 2015; Quandt, 2016). For example, responsibility sharing in FRM with non-state actors through property-level protection (Mees, Crabbé, et al., 2016; Mees, Suykens, et al., 2016) can be problematic if differences in socioeconomic and demographic characteristics are not recognised (Forrest et al., 2020), as those with less financial means may lack the capacity to take up responsibility (Snel et al., 2022). This can reinforce existing inequalities, weakening distributive justice (Thaler et al., 2018). Some socioeconomic and demographic characteristics (such as income, education and time availability; see Castillo et al., 2015) may also impact the capacity of people to participate in the development of FRM policy and strategies (Harries & Penning-Rowsell, 2011), negatively impacting procedural justice.

## 3 | METHODS

This article analyses recognition of differences in the capacity of people to deal with floods in national-level FRM in England (UK), Finland, Flanders (Belgium) and France. In the United Kingdom, the devolved administrations of individual countries manage their own flood risks. Similarly, in Belgium, competences for water management have been transferred to regional levels in 1988. For the sake of comparison, we therefore chose England and Flanders, respectively, as units of analysis. Although the four countries are not fully representative of FRM arrangements in Europe, the countries do reflect a broad range of flood risks, which occur in diverse cultural, political and socioeconomic circumstances. In terms of FRM, the countries differ in the size and role of the state, the importance of public funding and in their prioritisation of FRM strategies (see Table 1).

We adopt a qualitative approach in this study. First, key policy documents were identified in each of the countries that guide national efforts to manage and adapt to flood risks. We analysed the explicit presence or absence of recognition of factors that determine people's capacity to deal with floods in these policy documents. Analysis of policy documents is important as '[t]he use of policy documents as data allows one to examine what is

TABLE 1 Summary of the main characteristics of the countries included in the cross-country comparison.

	<b>Flood risks</b>	<b>Governance characteristics</b>	<b>Role of the state/public funding in FRM</b>	<b>FRM strategies prioritised</b>
England (United Kingdom)	Fluvial, coastal, surface water and sewage and groundwater flooding.	Liberalist-pluralist with strong decentralisation. Large cultural and socioeconomic differences between areas, with poverty remaining a real issue.	FRM is decentralised, with high expectations on local governments for flood protection. Public funding is often limited to X pence/pound sterling. Additional funding is to be raised through local partnerships.	Prevention (through planning) and defence are prominent. Preparation, response and recovery are also strong through emergency response and insurance. Importance of mitigation (e.g., nature-based solutions) is increasing.
Finland	Most commonly seasonal fluvial floods, but also coastal and pluvial floods.	Strong public welfare state, despite gradual reforms in the last 30 years. Income inequality rates among the lowest in the EU but concerns around unequal development of opportunities.	FRM is based on cross-administrative cooperation. FRM is almost exclusively publicly funded. Division of labour between regional authorities (fluvial and coastal floods) and municipalities (pluvial floods).	Defence, prevention and preparation are key pillars. Mitigation is the least institutionalised but gradually becoming more significant through nature-based solutions. Flood recovery is based on private flood insurance.
Flanders (Belgium)	Mainly regular small-scale fluvial and pluvial floods. Surface water run-off is increasing with urbanisation.	Strong public sector in a federal structure. Low and stable income inequality rates but little prospect of eliminating inequality.	Pluralist, state-oriented decision-making in FRM. Although FRM is not legally a state responsibility, most FRM strategies are initiated and funded by the government. Recently, more interest in responsibility and cost-sharing with citizens.	Defence is the oldest and strongest. Preparation and recovery are mainly governed at the federal level and are well-developed, and prevention and mitigation have recently become more strongly involved in FRM.
France	Fluvial, pluvial and surface water run-off; coastal flood risks due to sea submersion and erosion.	Strong public sector with a tradition of centralisation until the 1980s (some decentralisation since). Poverty rates remain stable, and the welfare model addresses inequality effectively compared to other countries.	FRM funding is mainly a public task. Responsibilities are increasingly shared between the central and local authorities. Private responsibilities are limited. National flood recovery is financed via an additional premium on housing and car insurances.	Defence has a strong historical tradition. Prevention is the main strategy in terms of social and political legitimacy. Strong recovery system through an insurance based on solidarity. Mitigation is less institutionalised.

Note: The table provides information on the types of flood risks, the cultural, political and socioeconomic context, the role of the state and public funding in FRM and the strategies prioritised in a national context (see Table 2 for an overview of the five FRM strategies).

Abbreviation: FRM, flood risk management.

included in the official planning of adaptation and what is not. Naturally, not everything will be implemented as stated in strategic policy documents. However, plans and strategies still create the basis for actions and guide,

e.g., who has access to the adaptation planning' (Juhola et al., 2022, p. 610).

These data were supported by formal, semi-structured interviews with national-level policy makers, public

authorities, experts and practitioners involved in the various FRM strategies, to validate findings from the document analyses and to better understand how policies were being implemented. The interviews also highlighted examples from FRM practice where there are efforts to strengthen recognition justice (or the opposite), without being mandated by policy to do so. Furthermore, interviews were important because perceptions held by public authorities of factors that determine people's capacity to deal with floods strongly influence their behaviour, intentions and choices and can stimulate or prevent policy change (de Goër de Herve, 2022); that is, they determine the opportunity space for strengthening recognition in FRM. We conducted 48 interviews in total, the number varying across the countries due to slight differences in methodology. In England and Flanders, the focus was on a larger number of individual interviews, whereas in Finland, document analyses were accompanied by a workshop with national-level experts to interpret the results. In France, current interviews were combined with data from previous projects (such as the STAR-FLOOD project). The interviews were guided by a short list of pre-prepared questions (as per Seidman et al., 2004). Questions were tailored to relevant country-specific circumstances and encouraged open discussion about inequality and justice concerns in FRM. Thematic analyses of the interview data were conducted to triangulate the findings of the policy analysis and interviews.

### 3.1 | Analytical framework

The five FRM strategies provide structure to our analysis. The strategies (see Table 2) are defined as 'approaches for dealing with flood risks which can be distinguished from one another by their focus on the probability of flooding, its consequences, or on recovery after a flood has struck' (Hegger et al., 2014, p. 4128). We are aware that other categorisations of FRM exist (see, e.g., Djordjević et al., 2011; Oosterberg et al., 2005). However, the five strategies, when coordinated and aligned, are meant to strengthen different flood resilience capacities (the capacity to resist, absorb and recover, and adapt and transform) (Driessen et al., 2018; Hegger et al., 2014, 2016). Enhancing the capacity of people to deal with floods requires recognition of (in) equality in each of these resilience capacities and therefore in each of the five strategies. The strategies cover a range of interventions and are implemented through multiple policy domains, by public and private actors (Forrest et al., 2020; Karrasch et al., 2021; Kaufmann et al., 2016; Keskitalo, 2013).

TABLE 2 Overview of the five FRM strategies and their main characteristics.

Strategy	Characteristics
1. Flood risk prevention	Prevention measures aim to decrease the consequences of flooding by decreasing the exposure of people/property, etc., via methods that prohibit or discourage development in areas at risk of flooding (through spatial planning, reallocation or expropriation policy).
2. Flood defence	Flood defence measures aim to decrease the probability of flooding through infrastructural works, such as dikes, dams, embankments and weirs, mostly referred to as 'flood defence' or 'structural measures'.
3. Flood risk mitigation	Mitigation focuses on decreasing the consequences of floods through measures inside the vulnerable area. Consequences can be mitigated by a smart design of the flood-prone area. Measures include spatial order, water retention within the protected area or (regulations for) flood-proof building.
4. Flood preparation (and response)	Consequences of floods can also be mitigated by preparing for a flood event. Measures include developing flood warning systems, preparing disaster management and evacuation plans and managing a flood when it occurs.
5. Flood recovery	This strategy facilitates a good and fast recovery after a flood event. Measures include reconstruction or rebuilding plans as well as compensation or insurance systems.

Abbreviation: FRM, flood risk management.

Source: Adapted from Hegger et al. (2016).

## 4 | RESULTS

Table 3 provides an overview of recognition justice in the five FRM strategies in England, Finland, Flanders and France. The table shows that in the strategies of flood risk prevention, defence and mitigation, there is little explicit recognition of differences in the capacity of people to deal with floods. It should be noted that our interview data suggest that interest in the (un)equal impacts of floods is increasing amongst flood risk managers, as illustrated by the following excerpt from England: 'it is not just material damage to your house, to your carpet, to your floors. It is about disrupting your life, disrupting your work. [For some] people, depending on their age or capabilities,

TABLE 3 Overview of the results of the analysis conducted in the four countries.

	Flood risk prevention	Flood defence	Flood risk mitigation	Flood preparation (and response)	Flood recovery
England (United Kingdom)	<p>The columns of flood risk prevention, defence and mitigation in England can be covered by the fact that FCERM Grant-in-Aid funding considers the index of multiple deprivation (number of households in the 20% most deprived category). However, the index is defined mainly by household income.</p> <p>The Neighbourhood Flood Vulnerability Index recognises susceptibility and inabilities to prepare, respond, and recover from floods, as well as levels of community support.</p>	N/A	N/A	<p>Responsibilities in preparation are coordinated through Local Resilience Forums and Strategic Coordination Groups. These include local emergency response and health bodies who should have the local knowledge to identify vulnerable groups. Furthermore, the National Flood Emergency Framework recognises groups that might be particularly vulnerable, for example, children, elderly, mobility impaired, mental/cognitive, and sensory impaired or the homeless.</p>	<p>FloodRe recognises the importance of risk-based pricing and delays the impact on high-risk properties. However, social vulnerabilities are not recognised by this system, which is based on asset value. Can be problematic, for example, for asset rich, income poor.</p>
Finland	N/A	N/A	N/A	<p>The FRM plans include references to locations of societal infrastructure such as hospitals, schools and kindergartens that require special attention in emergency responses. The FRM plans also mention the varying abilities of people to protect themselves in an emergency due to health or age ('people with reduced mobility' and 'elderly people dependent on home care').</p>	N/A
Flanders (Belgium)	N/A	N/A	N/A	<p>The National Crisis Centre in Belgium recognises and considers language and ethnicity in crisis communication. The River Basin Management Plans identify institutions that are difficult to evacuate (e.g., hospitals, care homes, schools and prisons). Furthermore, social vulnerability maps exist showing the socioeconomic impact of floods. This is based on information about the number of, for example,</p>	<p>Flood damage is included in the mandatory fire insurance. If someone does not have fire insurance but is entitled to social welfare benefits on the day a flood occurs, they can request a certificate from the Public Centre for Social Welfare to request compensation from the federal Disaster Fund. This relief mechanism recognises differences in people's capacity to recover from</p>

TABLE 3 (Continued)

Flood risk prevention		Flood defence	Flood risk mitigation	Flood preparation (and response)	Flood recovery
				residents entitled to social welfare benefits, disabled people and people >75 years old.	floods, based on socioeconomic status.
France	N/A	N/A	N/A	The Local Safety Plans ( <i>Plan Communal de Sauvegarde</i> ) are important tools for preparation, implemented by municipalities. In drafting the plans, a study on the potentially affected population is required, considering the elderly (>65 years old), disabled people, etc. Some municipalities have Safety Communal Groups ( <i>Réserves Communales de Sauvegarde</i> ), where volunteers participate in rescue operations and connect inhabitants to municipal services during emergencies.	Solidarity is a principle in the French constitution. In the context of floods, this refers to financial solidarity through insurance. Furthermore, a disaster compensation scheme exist that covers damage during major disasters. All landowners and car owners contribute to the scheme. However, no distinction is made in the capacity of vulnerable groups to contribute.

Note: The table shows for each of the FRM strategies whether or not there is recognition of differences in the capacity of people to deal with floods. N/A indicates that no examples of recognition justice were found in that strategy. Abbreviation: FCERM, Flood and Coastal Erosion Risk Management.

it has a more significant impact' (interview, 23-05-2022). There are also some examples from FRM practice, such as in local projects, where differences between people are taken into consideration. However, efforts to strengthen recognition in national-level FRM policy in prevention, defence and mitigation are rare. The strategy of flood preparation, however, is more sensitive to differences in the capacity of people to deal with floods. In the following sections, we illustrate the lack of recognition in prevention, defence and mitigation by drawing attention to three issues that emerged across the four countries: diversification of FRM and unclear responsibilities, an over-reliance of cost-benefit analyses (CBA) and tokenistic engagement.

#### 4.1 | Diversification of FRM and unclear responsibilities

The five FRM strategies are implemented by different policy domains which has important implications for the division of responsibility. Roles and responsibilities in FRM may be well defined in law, such as through the

Flood and Water Management Act 2010 in England and the National Flood Risk Act in Finland. However, in practice, the situation becomes more complex. The results show that this is especially true for flood risk prevention, defence and mitigation in the four countries. Flood causes and impacts often span administrative boundaries and involve assets (e.g., infrastructure, natural habitats, residential areas) that are the responsibility of different flood risk managers. For example, in Flanders, responsibilities are divided over four categories of watercourses and four levels of government (Mees, Crabbé, et al., 2016; Mees, Suykens, et al., 2016). During interviews, Finnish FRM experts raised the concern that the complex and 'fuzzy' actor networks in FRM often lead to processes that lack transparency. Similarly, in England, 'there are so many people involved in flooding, the layers of bureaucracy, you know, even we struggle with it sometimes [...] and have been doing it for 20 years' (interview, 10-02-23). Unclear responsibilities may obstruct strengthening recognition justice in FRM for two reasons.

First, a lack of clarity over responsibilities in FRM can lead to inaction as time and energy are spent

coordinating collaborative work, and it raises questions around who is responsible to strengthen recognition in the first place. Interview data show that FRM practitioners often feel that addressing differences in the capacity of people to deal with floods is not their responsibility. In Flanders, these differences are seen as broader societal problems that should be dealt with outside of FRM: ‘these inequalities are not related specifically to water management and FRM policy. These are fundamental inequalities of people in society [...] and have nothing to do with FRM. It also happens in the domains of child poverty, youth, healthcare, and education’ and ‘it is not the flood risk managers’ responsibility’ (interview, 26-08-21). In France, responsibilities in FRM have been clarified following the 2004 Law on the Reform of Civil Security and the 2014 MAPTAM Law (Fournier, 2019)—with a greater share of tasks for local authorities in prevention, defence and preparation. However, until now, this has not placed recognition at the centre of the debate, raising questions around the extent to which flood risk managers perceive it as their responsibility to tackle.

Second, if responsibilities in FRM are unclear, the burden of holding actors to account—and even figuring out who the responsible actors are—can fall on vulnerable communities. Partnership Funding systems for FRM, such as introduced in England, illustrate this further and demonstrates how complicated FRM projects can be. In 2011, the government set a limit on the proportion of its own contributions per £1 towards projects, with local authorities coordinating fundraising efforts to cover the remaining costs (Penning-Rowsell, 2015). Although this is a way to tailor solutions to local problems—and boost innovation (Alexander et al., 2016)—the process can be laborious, expensive and ad hoc, and it exposes the complexities of governing flood risks. It is not uncommon for residents to spend ‘honesty hours a day, sometimes all weekend, writing letters, reading reports’ (interview, 09-12-2022), just to understand who is responsible and whom to report problems to. Similarly, interviews in Finland show that those at risk of flooding have problems identifying which actors are responsible for FRM in the region, which, for example, is illustrated by the low engagement of citizens in drafting the FRM plans (FRMPs).

## 4.2 | Over-reliance on CBA

In addition to unclear responsibilities in FRM, decision making is often based on CBA in flood risk prevention, defence and mitigation. Flood risk managers in Flanders, for example, explain that when deciding on a measure, the

focus is on ‘costs and benefits, on how much money we can save, and how much we have to invest’ (interview, 30-09-22). The same applies to France and Finland (Centre Européen de Prévention du Risque d’Inondation, 2010; Finnish Ministry of Agriculture and Forestry, 2010a). The results show that most CBA approaches in FRM focus on maximising flood risk reduction benefits (i.e., largest number of assets protected at the lowest possible cost). Flood risks are often determined by modelling the flood hazard and the economic impact, that is, the number of buildings and built assets at risk. This approach may be too narrow for FRM because it obscures the need to recognise the impact of floods on those who are more vulnerable to those impacts. In England, a recognition mechanism has been included in CBAs. For example, the Flood and Coastal Erosion Risk Management (FCERM) Grant-in-Aid funding calculator considers the benefits of projects for deprived households when allocating funding for FRM (Environment Agency, 2022). However, this indicator, which in itself plays a relatively minor role, lacks nuance and is weighted heavily towards income and employment data, whereas determinants of social vulnerability—such as ethnicity, health or landownership—carry little weight.

In the four countries, efforts are being made to map the socioeconomic impacts of floods. In Finland and France, factors that determine someone’s capacity to deal with floods are increasingly highlighted, but this often occurs on voluntary basis. For example, in France, through the preparation of Local Safety Plans, municipalities may decide on identifying individuals and communities with reduced capacities to prepare for floods (Direction de la Défense et de la Sécurité Civiles, 2005). In Flanders and England, maps showing the social impacts of floods already exist (e.g., Sayers et al., 2017). However, these are often based on quantitative data and do not incorporate the community perspectives. The maps are also not formally used in FRM decision making, although in England, they have been used in research projects to improve the understanding of flood insurance take-up and social vulnerability more broadly. When deciding on projects, the objective is to maximise project longevity and the number of houses protected. CBAs do not pick up on the socioeconomic and demographic characteristics of people living in these houses because of the difficulty of attaching a monetary value to these aspects (interview, 30-09-22).

## 4.3 | Tokenistic engagement

There are traditions of public engagement in FRM in the four countries. The commitment to consultation is often



enshrined in law, both national and international. Under the European Water Framework Directive (2000/60/EC), for example, member states are obliged to consult the public when preparing the river basin management plans (RBMPs). This is also the case for the United Kingdom, as much of the WFD has already been transposed into UK law before leaving the European Union. However, opportunities for genuine participation in FRM are rare. In Flanders, participation possibilities are often limited to official public enquiry, focussing on informing rather than co-producing (Mees, Crabbé, et al., 2016; Mees, Suykens, et al., 2016). ‘Flood risk managers start participation processes with a list of potential measures in mind and try to get citizens to propose the same ideas. Citizens feel like they came up with the plan, which provides more support for the measures’ and ‘participation [...] is seen as a means to reduce resistance’ (interview, 29-09-21; 26-10-21).

Similar concerns exist in England. For example, ‘[t]he FCERM Strategy was developed collaboratively. [...] But the final draft that communities were involved in [...] and what came back out of Defra [sic] [...] are two rather different things. So, the language got changed from being collaborative and more sympathetic, to being very ministerial and top-down’ (interview, 30-03-2022). Most FCERM decisions in England involve a degree of community engagement and discussion as authorities are obliged to consult locally. However, the quality of this engagement and the extent to which local perspectives influence the decisions varies. In France, participation procedures during, for example, the establishment of Flood Prevention Plans often consist of public hearings and are not designed to build co-decision, despite a national commitment to discussion and deliberation at an early stage (Ledoux, 2006). In Finland, however, flood risk prevention is a decentralised process that stimulates self-governance. According to the Finnish Local Government Act, residents and service users must be granted broad rights to influence decision-making. The municipal governments, in turn, are obliged to consider residents’ interests and needs. However, even with these far-reaching participation opportunities for residents, resources of groups to participate are not equally divided creating an environment for potential political power imbalances (Sjöblom, 2022).

These imbalances underline the importance of recognition in participation processes. Although it is acknowledged that those who participate are often not representative of all groups in the society, it remains unclear how to involve and engage vulnerable groups. Flood risk managers in Flanders underline that it remains ‘difficult to involve everyone. [...] Citizens who participate are always those who are already involved in water policy

or in nature associations. [...] It is very difficult to reach socially vulnerable groups’ (interview, 27-09-21). Furthermore, in England, participation in policymaking can be ‘lacking in transparency, not engaging the right citizens, and consulting too narrowly’ (House of Commons, 2012). In other words, without explicit recognition, it is unlikely that everyone will attend participation processes, and some needs may be overlooked. Combined with processes that inform citizens of actions, rather than facilitate their input into the design of these actions, this may result in tokenistic engagement processes.

#### 4.4 | Recognition in flood preparation (and response)

In contrast to the strategies of prevention, defence and mitigation, flood preparation is more sensitive to differences in the capacity of people to deal with floods. For example, the RBMPs in Flanders and the FRMPs in Finland identify institutions that are difficult to evacuate, such as hospitals, care homes, prisons and schools (Coördinatiecommissie Integraal Waterbeleid (CIW), 2011; Finnish Ministry of Agriculture and Forestry, 2010b). The Finnish FRMPs also recognise the varying abilities of people to protect themselves in an emergency, although rescue needs are discussed in terms of property characteristics. In England, the National Flood Emergency Framework, a policy framework for flood emergency planning and response, contains a section to help operating authorities identify those groups in society that are most vulnerable to floods, focusing on factors such as age, mobility, (mental) health, and language (Department for Environment, 2014). Similarly, in France, Local Safety Plans are drafted by municipalities and identify communities most likely to be adversely affected by floods (Direction de la Défense et de la Sécurité Civiles, 2005). Recognition of differences in the capacity of people to deal with floods can also be seen in crisis communication for flood emergencies. In Flanders, the National Crisis Centre considers language and ethnicity through inclusive communication, because ‘it is of paramount importance that everyone understands the information. Whether you are Belgian or non-Belgian, a visitor or a resident, that does not matter’ (interview, 29-10-21).

Furthermore, compared with prevention, defence and mitigation, the countries show robust frameworks for clarifying the roles of different actors in flood preparation and response. During—and in the immediate aftermath of—flood events, time is limited and responsibilities need to be clear to facilitate quick action. Responses are also often practised regularly by emergency planners and

responders. The ability to respond quickly combined with a good understanding of the different factors that determine someone's capacity to deal with floods may reduce the likelihood of floods disproportionately impacting the most vulnerable.

## 5 | DISCUSSION

One of the main results of this paper is a difference in attention to recognition justice amongst the different FRM strategies. We found that flood risk prevention, defence and mitigation do not actively recognise differences in the capacity of people to deal with floods, whereas flood preparation does. In the following sections, we further explain this by drawing links to relevant literature. We also discuss strategies that serve as opportunity spaces for strengthening recognition justice in FRM.

### 5.1 | The challenge of recognition in FRM

The strategies of prevention, defence and mitigation currently do not explicitly recognise differences in the capacity of people to deal with floods in the four countries. This may be explained by the fact that these strategies mainly focus on reducing the exposure of people and infrastructures to floods. Generally, flood risks are determined based on the function of hazard (i.e., the probability of a flood event), exposure (i.e., number of built assets at risk) and vulnerability (Koks et al., 2015). However, understanding of the different factors that determine vulnerability, or people's capacity to deal with floods, remains incomplete. It is often believed that flood exposure is the main determinant, but studies have shown that vulnerability is also strongly rooted in how people are affected by floods (Munyai et al., 2019). The social, physical, financial, or psychological characteristics that determine someone's capacity to deal with floods are often overlooked.

In light of increasing flood risks, major investments are needed in all FRM strategies. However, the results show that decision making in prevention, defence and mitigation is often based on hydrological modelling, determining the optimal—and usually technical—solution in terms of reducing the exposure of people and infrastructure. Combined with limited financial resources in FRM (Koks et al., 2015), this leads to decision making based on expected flood risk reduction benefits. A positive element to CBA in FRM is that it favours those areas with the highest risks. However, studies have shown that CBAs undervalue the socioeconomic impacts of flooding

(Cutter et al., 2013; Kind et al., 2017). The interests and needs of those who struggle to deal with floods are therefore often not recognised (Kind et al., 2020). Frameworks have been presented that integrate these impacts into CBAs, by considering differences in the capacity of people to deal with floods. For example, Kind et al. (2020) illustrate the feasibility of a social welfare CBA that accounts for socioeconomic and demographic population characteristics and their resilience. Their framework draws attention to the importance of flood insurance (i.e., flood recovery) in situations where individuals' capacity to deal with floods is low. However, this raises questions around the ability of groups with limited financial means to afford flood insurance (Koks et al., 2015). In addition, although addressing the socioeconomic impacts of floods through flood recovery is an important step forward, strengthening the capacity of people to deal with floods requires enhancing recognition all FRM strategies.

In the results, we presented the diversification of strategies as a potential obstacle to recognition justice in FRM, as it causes confusion around who is responsible for addressing justice concerns. Not only is a clear division of responsibilities key to ensuring that FRM systems function effectively (Begg, 2018), confusion around who is responsible also places the burden of identifying FRM actors and holding them to account on vulnerable communities. Clarifying responsibilities requires efforts to align the different domains involved in FRM (water management, spatial planning and crisis management, amongst others) through bridging mechanisms such as information exchange, coordination of policies and cooperation mechanisms (Driessen et al., 2018). Although Hegger et al. (2020) found that efforts are being made to strengthen the collaboration between the strategies in, for example, England and France, often a holistic perspective across the five strategies is still missing.

### 5.2 | Opportunity spaces

Although recognition currently seems undeveloped in FRM in England, Finland, Flanders and France, opportunity spaces can be identified to strengthen recognition justice in all four countries. We found that flood preparation is more sensitive to differences in the capacity of people to deal with floods, compared to prevention, defence and mitigation. We therefore further explain why this is the case and underline the importance for the other strategies to take preparation as an example. We also discuss flood risk prevention as an opportunity space for recognition justice, as this strategy is increasingly important adapt to flood risks (Hartmann et al., 2019).

### 5.2.1 | Links between flood preparation, disaster relief and health care

Flood preparation actively recognises differences in the capacity of people to deal with floods. Preparation focuses on flood warning systems, preparing disaster and evacuation plans and managing a flood when it occurs (Hegger et al. 2013) and requires attention to emergency planning, crisis management and disaster relief. It has been widely acknowledged that some groups in society are more likely to be adversely affected by flood disasters (Fothergill & Peek, 2004). Essentially, preparation is about saving lives during and in the immediate aftermath of a flood. For this to be successful, knowledge of differences in the capacity of people to deal with a flood event is required (Flanagan et al., 2011). An understanding of the needs of individuals and groups may stimulate informed decisions and coordination between governmental first aid responders, NGOs and individuals (Orru et al., 2022). The importance of considering differences in the capacity of people to deal with disasters has also been underlined outside of the academic literature. For example, the Sendai Framework for Disaster Risk Reduction (UN, 2015) calls for frameworks to better understand the drivers of risk, such as the consequences of poverty and inequality for the susceptibility of a community to the impacts of a hazard. Furthermore, there are strong linkages between the domains of disaster relief and health care. Health care organisations are an integral component of emergency and disaster response (McCarthy et al., 2009), and there has been extensive research into understanding the factors that determine someone's vulnerability in health care (Waisel, 2013). This may have strengthened recognition justice in flood preparation.

Arguably, the strategies that focus on reducing flood exposure should consider the strength of recognition justice in flood preparation as a best practice, as the effectiveness of FRM strategies also strongly depends on the capacity of individuals to adapt (Koks et al., 2015). Furthermore, ignoring capacity differences in FRM can create or exacerbate inequalities in flood risks (Thaler et al., 2018). Strengthening different resilience capacities (see Driessen et al., 2018) requires attention to social determinants of vulnerability in all FRM strategies. This calls for a simplification of the actor networks that currently characterise prevention, defence and mitigation. Or, alternatively, work may be required to ensure that FRM systems adopt varied governance modes to cater for the complexity of both the system and the needs (Pahl-Wostl, 2019). Either way, we are inclined to suggest that a simplification (and clarification) of roles and responsibilities would be a useful step, following the example of the robust division of responsibilities in flood preparation

in the four countries. In a simpler system, resources spent coordinating collaborative work could be redirected to increase the capacity to consider and reduce the social vulnerability of communities (Orru et al., 2022).

### 5.2.2 | Spatial planners as multidisciplinary actors in flood risk prevention

It has been widely accepted that traditional flood defence is reaching its limits. Residual flood risks remain (Plate, 2002; Santoro et al., 2019). Measures such as embankments and dams can also exacerbate environmental problems, resulting in increased flood risks and high maintenance costs for infrastructure (Seijger et al., 2017). In recent decades, there has been more interest in the use of water retention areas, increasing the space for rivers to flow freely and nature-based solutions to reduce flood risks (Hartmann et al., 2019). These types of strategies inherently focus on the use of space, and more specifically, on preserving open space for water, which requires the active involvement of spatial planning through flood risk prevention and mitigation (Hartmann & Driessen, 2017).

The growing importance of spatial planning for FRM underlines the urgency of strengthening recognition justice in flood risk prevention and mitigation. The need for planning to consider social, cultural and economic processes has been acknowledged (Friedmann, 1973; Healey, 2003). This is especially relevant, as measures in prevention and mitigation (e.g., natural water retention areas, increasing green spaces) have been related to issues of accessibility, social exclusion and displacement of communities through green gentrification, potentially exacerbating inequality (Sekulova et al., 2021). The literature underlines that spatial planners are often seen as multidisciplinary and mediating actors, guiding decision-making related to all governmental policy domains (Boussauw & Lauwers, 2020; Busscher et al., 2019). Planners' expertise and multidisciplinary role might put them in a position to better account for differences in the capacity of people to deal with floods and to inspire engineers (responsible for flood defence) to take community and resident perspectives into consideration. This is not to say that planners should take sole responsibility for this task, but it does point to the need for strengthening collaboration between the domains involved in FRM. Future research could explore the potential for planners to account for differences in the capacity of people to deal with floods.

Although at present, spatial planning has not placed recognition justice firmly on the FRM agenda, we found some best practices in spatial planning in the four

countries that may provide an opportunity space to strengthen recognition. For example, in Finland, prevention is the main responsibility of municipalities and is strongly based on municipal autonomy and self-governance. Laws and regulations ensure broad participation rights for residents and service users, with opportunities for citizen influence often in the initial stages of planning processes. Hence, prevention in Finland is locally and democratically organised, which increases opportunities for residents to have their needs and interests heard—contributing to both recognition and procedural justice (Begg, 2018). Participation processes can bring fresh perspectives to decision making (O'Hare & White, 2018), which strengthens the sensitivity of decision outcomes to differences in the capacity of people to deal with floods. In Flanders, those who rent or sell their property are obliged to disclose flood risks, a measure called the 'duty to inform' (Mees, 2017). It ensures tenants or buyers are informed about the existing flood risks of the building or land they are interested in. A similar obligation exists in France (Ledoux, 2006). This is important in the context of recognition justice because it ensures that those groups who may be less aware of existing flood risks and are less likely to receive information in disaster situations are up to date (Fielding & Burningham, 2005; Tyler et al., 2019; Zahran et al., 2008).

## 6 | CONCLUSION

This article provides a cross-country comparison of recognition justice in FRM in England, Finland, Flanders and France. Through an analysis of national-level policy and interviews with public authorities, experts and practitioners in FRM, we found that (1) there is little explicit recognition in FRM policy, although there are promising examples in practice where work is being done to take different needs and perspectives into consideration, and (2) there is a difference in recognition between the five FRM strategies. The strategies of flood risk prevention, defence and mitigation focus on hazard reduction and minimising the exposure of people and assets to floods, whereas flood preparation is more sensitive to differences in the capacity of people to deal with floods. This could be explained by the connections between preparation and disaster relief, where determinants of people's capacity to deal with an emergency have been researched extensively and, in practice, have proven crucial to decrease human suffering and economic losses. We argued that the strategies of prevention and preparation are important opportunity spaces to strengthen recognition justice in FRM.

Although we acknowledge that cultural, political and socioeconomic differences exist, which may complicate the comparison between the four countries in this article (as well as translating the results to other countries), strong common themes emerged nevertheless. We also mainly focussed on national-level FRM, whereas local-level policymakers and practitioners may be better placed to recognise differences in the capacity of people to deal with floods—due to their closer proximity to residents. However, national-level policy does provide the framework within which local-level plans are formulated and is therefore a valuable starting point to analyse recognition justice. Future research might explore the issues raised here in different socioeconomic and cultural contexts, as well as analyse local-level policies and plans.

## ACKNOWLEDGEMENTS

The research for this article was conducted in the context of SOLARIS (*SOLidarity in climate change Adaptation policies: towards more socio-spatial justice in the face of multiple RISks*), a project organised by the joint transnational SOLSTICE call 'Enabling Societal Transformation in the Face of Climate Change' launched by JPI Climate. The work was supported by funding from the Economic and Social Research Council in the UK (grant number ES/V014021/1), the Academy of Finland (decision number 338284), the Belgian Science Policy Office (contract number B2/20E/P3/SOLARIS) and the Agence National de la Recherche (project number ANR-20-SOLS-0003) in France. The authors would also like to thank the respondents for their cooperation and insights into FRM policy and practice in each of the countries, as well as the reviewers for their valuable input to improve the quality of this article.

## DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the findings of this study are available within the article. Raw interview data are not publicly available due to privacy or ethical restrictions. Additional data will be made available through reports published in the repositories of the involved universities after the SOLARIS project ends.

## ORCID

Mandy Paauw  <https://orcid.org/0000-0002-0914-3222>

Marie Fournier  <https://orcid.org/0000-0002-2652-0202>

## REFERENCES

- Agyeman, J. (2013). *Introducing just sustainabilities: Policy, planning, and practice*. Zed Books Ltd.
- Alexander, M., Doorn, N., & Priest, S. (2018). Bridging the legitimacy gap—Translating theory into practical signposts for

- legitimate flood risk governance. *Regional Environmental Change*, 18(2), 397–408. <https://doi.org/10.1007/s10113-017-1195-4>
- Alexander, M., Priest, S. J., Micou, P., Tapsell, S. M., Green, C. H., Parker, D. J., & Homewood, S. (2016). *Analysing and evaluating flood risk governance in England—enhancing societal resilience through comprehensive and aligned flood risk governance arrangements*. STAR-FLOOD Consortium The report can be downloaded through this link [https://www.researchgate.net/publication/299467885\\_Analysing\\_and\\_evaluating\\_flood\\_risk\\_governance\\_in\\_England\\_-\\_Enhancing\\_societal\\_resilience\\_through\\_comprehensive\\_and\\_aligned\\_flood\\_risk\\_governance\\_arrangements](https://www.researchgate.net/publication/299467885_Analysing_and_evaluating_flood_risk_governance_in_England_-_Enhancing_societal_resilience_through_comprehensive_and_aligned_flood_risk_governance_arrangements). Accessed 4 January 2024
- Begg, C. (2018). Power, responsibility and justice: A review of local stakeholder participation in European flood risk management. *Local Environment*, 23(4), 383–397. <https://doi.org/10.1080/13549839.2017.1422119>
- Boussauw, K., & Lauwers, D. (2020). The spatial planner as a mediator or as an actor? Looking back at the recent debate about new shopping malls in the Brussels periphery. In B. Boonstra, P. Davids, & A. Staessen (Eds.), *Opening up the planning landscape: 15 years of actor-relational approaches to spatial planning in Flanders, the Netherlands and Beyond* (pp. 149–156). InPlanning.
- Boyd, E., Chaffin, B. C., Dorkenoo, K., Jackson, G., Harrington, L., N'Guetta, A., Johansson, E. L., Nordlander, L., Paolo De Rosa, S., Raju, E., Scown, M., Soo, J., & Stuart-Smith, R. (2021). Loss and damage from climate change: A new climate justice agenda. *One Earth*, 4(10), 1365–1370. <https://doi.org/10.1016/j.oneear.2021.09.015>
- Bulkeley, H., Edwards, G. A. S., & Fuller, S. (2014). Contesting climate justice in the city: Examining politics and practice in urban climate change experiments. *Global Environmental Change*, 25, 31–40. <https://doi.org/10.1016/j.gloenvcha.2014.01.009>
- Busscher, T., van den Brink, M., & Verweij, S. (2019). Strategies for integrating water management and spatial planning: Organising for spatial quality in the Dutch “Room for the River” program. *Journal of Flood Risk Management*, 12(1), e12448. <https://doi.org/10.1111/jfr3.12448>
- Castillo, J. C., Palacios, D., Joignant, A., & Tham, M. (2015). Inequality, distributive justice and political participation: An analysis of the case of Chile. *Bulletin of Latin American Research*, 34(4), 486–502. <https://doi.org/10.1111/blar.12369>
- Centre Européen de Prévention du Risque d'Inondation. (2010). *L'ACB (analyse coût/bénéfice): une aide à la décision au service de la gestion des inondations. Guide à l'usage des maîtres d'ouvrage et de leurs partenaires*.
- Ciscar, J.-C., Iglesias, A., Feyen, L., Szabó, L., Van Regemorter, D., Amelung, B., Nicholls, R., Watkiss, P., Christensen, O. B., & Dankers, R. (2011). Physical and economic consequences of climate change in Europe. *Proceedings of the National Academy of Sciences of the United States of America*, 108(7), 2678–2683. <https://doi.org/10.1073/pnas.1011612108>
- Coninx, I., & Bachus, K. (2007). *Integrating social vulnerability to floods in a climate change context*. Retrieved April 10, 2019. Accessed 4 January 2024. from [https://www.researchgate.net/profile/Kris-Bachus/publication/228386592\\_Integrating\\_social\\_vulnerability\\_to\\_floods\\_in\\_a\\_climate\\_change\\_context/links/5565f5e108aec22682ff1418/Integrating-social-vulnerability-to-floods-in-a-climate-change-context.pdf](https://www.researchgate.net/profile/Kris-Bachus/publication/228386592_Integrating_social_vulnerability_to_floods_in_a_climate_change_context/links/5565f5e108aec22682ff1418/Integrating-social-vulnerability-to-floods-in-a-climate-change-context.pdf)
- Coördinatiecommissie Integraal Waterbeleid (CIW). (2011). *Stroomgebiedbeheerplan voor de Schelde (2016–2021)*. Accessed 4 January 2024. <https://www.integraalwaterbeleid.be/nl/stroomgebiedbeheerplannen/stroomgebiedbeheerplannen-2016-2021/stroomgebiedbeheerplannen-voor-schelde-en-maas-2016-2021>
- Cutter, S. L., Emrich, C. T., Morath, D., & Dunning, C. (2013). Integrating social vulnerability into federal flood risk management planning. *Journal of Flood Risk Management*, 6(4), 332–344. <https://doi.org/10.1111/jfr3.12018>
- de Goër de Herve, M. (2022). Fair strategies to tackle unfair risks? Justice considerations within flood risk management. *International Journal of Disaster Risk Reduction*, 69(102), 745. <https://doi.org/10.1016/j.ijdr.2021.102745>
- Department for Environment, Food and Rural Affairs. (2014). *The national flood emergency framework for England*. Retrieved April 5, 2023, from [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/388997/pb14238-nfef-201412.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/388997/pb14238-nfef-201412.pdf)
- Direction de la Défense et de la Sécurité Civiles. (2005). *Plan communal de sauvegarde: guide pratique d'élaboration*. Accessed 4 January 2024. Ministry responsible: Ministère de l'Intérieur et de l'Aménagement du territoire.
- Djordjević, S., Butler, D., Gourbesville, P., Mark, O., & Pasche, E. (2011). New policies to deal with climate change and other drivers impacting on resilience to flooding in urban areas: The CORFU approach. *Environmental Science & Policy*, 14(7), 864–873.
- Dorkenoo, K., Scown, M., & Boyd, E. (2022). A critical review of disproportionality in loss and damage from climate change. *WIREs Climate Change*, 13(4), e770. <https://doi.org/10.1002/wcc.770>
- Driessen, P. P., Hegger, D. L., Kundzewicz, Z. W., Van Rijswick, H. F., Crabbé, A., Larrue, C., Matczak, P., Pettersson, M., Priest, S., & Suykens, C. (2018). Governance strategies for improving flood resilience in the face of climate change. *Water*, 10(11), 1595. <https://doi.org/10.3390/w10111595>
- Eakin, H., Parajuli, J., Yogya, Y., Hernández, B., & Manheim, M. (2021). Entry points for addressing justice and politics in urban flood adaptation decision making. *Current Opinion in Environmental Sustainability*, 51, 1–6. <https://doi.org/10.1016/j.cosust.2021.01.001>
- Environment Agency. (2022). *Partnership funding calculator 2020 for FCERM grant-in-aid (GIA)*. Retrieved April 5, 2023, from <https://www.gov.uk/government/publications/partnership-funding-calculator-2020-for-fcerm-grant-in-aid-gia>
- Fielding, J., & Burningham, K. (2005). Environmental inequality and flood hazard. *Local Environment*, 10(4), 379–395. <https://doi.org/10.1080/13549830500160875>
- Finnish Ministry of Agriculture and Forestry. (2010a). *Flood risk management act (620/2010)*. Retrieved May 12, 2023, from <https://www.finlex.fi/en/laki/kaannokset/2010/en20100620.pdf>
- Finnish Ministry of Agriculture and Forestry. (2010b). *Government Decree on Flood Risk Management (659/2010)*. Retrieved May 12, 2023, from <https://www.finlex.fi/fi/laki/alkup/2010/20100659#Pidm45053758867024>
- Flanagan, B. E., Gregory, E. W., Hallisey, E. J., Heitgerd, J. L., & Lewis, B. (2011). A social vulnerability index for disaster

- management. *Journal of Homeland Security and Emergency Management*, 8(1), 1–24. <https://doi.org/10.2202/1547-7355.1792>
- Forrest, S. A., Trell, E.-M., & Woltjer, J. (2020). Socio-spatial inequalities in flood resilience: Rainfall flooding in the city of Arnhem. *Cities*, 105(102), 843. <https://doi.org/10.1016/j.cities.2020.102843>
- Foster, S., Leichenko, R., Nguyen, K. H., Blake, R., Kunreuther, H., Madajewicz, M., Petkova, E. P., Zimmerman, R., Corbin-Mark, C., & Yeampierre, E. (2019). New York City panel on climate change 2019 report chapter 6: Community-based assessments of adaptation and equity. *Annals of the New York Academy of Sciences*, 1439(1), 126–173.
- Fothergill, A., & Peek, L. A. (2004). Poverty and disasters in the United States: A review of recent sociological findings. *Natural Hazards*, 32(1), 89–110. <https://doi.org/10.1023/B:NHAZ.0000026792.76181.d9>
- Fournier, M. (2019). Flood governance in France. In I. La Jeunesse & C. Larrue (Eds.), *Facing hydrometeorological extreme events* (pp. 125–139). John Wiley & Sons Ltd. <https://doi.org/10.1002/9781119383567.ch9>
- Friedmann, J. (1973). *Retracking America: A theory of transactive planning*. Anchor Press.
- Gourevitch, J. D., Singh, N. K., Minot, J., Raub, K. B., Rizzo, D. M., Wemple, B. C., & Ricketts, T. H. (2020). Spatial targeting of floodplain restoration to equitably mitigate flood risk. *Global Environmental Change*, 61(102), 50. <https://doi.org/10.1016/j.gloenvcha.2020.102050>
- Harries, T., & Penning-Rowsell, E. (2011). Victim pressure, institutional inertia and climate change adaptation: The case of flood risk. *Global Environmental Change*, 21(1), 188–197. <https://doi.org/10.1016/j.gloenvcha.2010.09.002>
- Hartmann, T., & Driessen, P. (2017). The flood risk management plan: Towards spatial water governance. *Journal of Flood Risk Management*, 10(2), 145–154. <https://doi.org/10.1111/jfr3.12077>
- Hartmann, T., Slavíková, L., & McCarthy, S. (2019). Nature-based solutions in flood risk management. In T. Hartmann, L. Slavíková, & S. McCarthy (Eds.), *Nature-based flood risk management on private land: Disciplinary perspectives on a multidisciplinary challenge* (pp. 3–8). Springer. [https://doi.org/10.1007/978-3-030-23842-1\\_1](https://doi.org/10.1007/978-3-030-23842-1_1)
- Hay, A. M. (1995). Concepts of equity, fairness and justice in geographical studies. *Transactions of the Institute of British Geographers*, 20, 500–508.
- Healey, P. (2003). Collaborative planning in perspective. *Planning Theory*, 2(2), 101–123. <https://doi.org/10.1177/14730952030022002>
- Hegger, D., Alexander, M., Raadgever, T., Priest, S., & Bruzzone, S. (2020). Shaping flood risk governance through science-policy interfaces: Insights from England, France and the Netherlands. *Environmental Science & Policy*, 106, 157–165. <https://doi.org/10.1016/j.envsci.2020.02.002>
- Hegger, D. L., Driessen, P. P., Wiering, M., Van Rijswick, H. F., Kundzewicz, Z. W., Matczak, P., Crabbé, A., Raadgever, G. T., Bakker, M. H., & Priest, S. J. (2016). Toward more flood resilience: Is a diversification of flood risk management strategies the way forward? *Ecology and Society*, 21(4). <https://doi.org/10.5751/ES-08854-210452>
- Hegger, D. L. T., Driessen, P. P. J., Dieperink, C., Wiering, M., Raadgever, G. T. T., & van Rijswick, H. F. M. W. (2014). Assessing stability and dynamics in flood risk governance. *Water Resources Management*, 28(12), 4127–4142. <https://doi.org/10.1007/s11269-014-0732-x>
- Hegger, D. L., Green, C., Driessen, P. P. J., Bakker, M. H., Dieperink, C., Crabbé, A., Deketelaere, K., Delvaux, B., Suykens, C., & Beyers, J.-C. (2013). *Flood risk management in Europe: similarities and differences between the STAR-FLOOD consortium countries*. STAR-FLOOD Consortium.
- House of Commons. (2012). Public Administration Select Committee. Public engagement in policy-making—Second Report of Session 2013–14. Report, together with formal minutes, oral and written evidence. Retrieved February 27, 2023, from <https://publications.parliament.uk/pa/cm201314/cmselect/cmpubadm/75/75.pdf>
- IPCC. (2001). *Climate change 2001: Synthesis report. A contribution of working groups I, II, and III to the third assessment report of the Intergovernmental panel on climate change*. C. U. Press.
- Johnson, C., Penning-Rowsell, E., & Parker, D. (2007). Natural and imposed injustices: The challenges in implementing ‘fair’ flood risk management policy in England. *Geographical Journal*, 173(4), 374–390. <https://doi.org/10.1111/j.1475-4959.2007.00256.x>
- Juhola, S., Heikkinen, M., Pietilä, T., Groundstroem, F., & Käyhkö, J. (2022). Connecting climate justice and adaptation planning: An adaptation justice index. *Environmental Science & Policy*, 136, 609–619. <https://doi.org/10.1016/j.envsci.2022.07.024>
- Kabisch, N., Frantzeskaki, N., Pauleit, S., Naumann, S., Davis, M., Artmann, M., Haase, D., Knapp, S., Korn, H., Stadler, J., Zaunberger, K., & Bonn, A. (2016). Nature-based solutions to climate change mitigation and adaptation in urban areas perspectives on indicators, knowledge gaps, barriers, and opportunities for action. *Ecology and Society*, 21(2). <https://doi.org/10.5751/ES-08373-210239>
- Karrasch, L., Restemeyer, B., & Klenke, T. (2021). The ‘flood resilience rose’: A management tool to promote transformation towards flood resilience. *Journal of Flood Risk Management*, 14(3), e12726. <https://doi.org/10.1111/jfr3.12726>
- Kaufmann, M., Mees, H., Liefferink, D., & Crabbé, A. (2016). A game of give and take: The introduction of multi-layer (water) safety in the Netherlands and Flanders. *Land Use Policy*, 57, 277–286. <https://doi.org/10.1016/j.landusepol.2016.05.033>
- Kaufmann, M., Priest, S. J., & Leroy, P. (2018). The undebated issue of justice: Silent discourses in Dutch flood risk management. *Regional Environmental Change*, 18(2), 325–337. <https://doi.org/10.1007/s10113-016-1086-0>
- Kellens, W., Vanneville, W., Verfaillie, E., Meire, E., Deckers, P., & De Maeyer, P. (2013). Flood risk management in Flanders: Past developments and future challenges. *Water Resources Management*, 27(10), 3585–3606. <https://doi.org/10.1007/s11269-013-0366-4>
- Keller, K., Helgeson, C., & Srikrishnan, V. (2021). Climate risk management. *Annual Review of Earth and Planetary Sciences*, 49(1), 95–116. <https://doi.org/10.1146/annurev-earth-080320-055847>

- Keskitalo, E. C. H. (2013). *Climate change and flood risk management: Adaptation and extreme events at the local level*. Edward Elgar Publishing.
- Kind, J., Botzen, W. J. W., & Aerts, J. C. J. H. (2020). Social vulnerability in cost–benefit analysis for flood risk management. *Environment and Development Economics*, 25(2), 115–134. <https://doi.org/10.1017/S1355770X19000275>
- Kind, J., Wouter Botzen, W. J., & Aerts, J. C. J. H. (2017). Accounting for risk aversion, income distribution and social welfare in cost–benefit analysis for flood risk management. *WIREs Climate Change*, 8(2), e446. <https://doi.org/10.1002/wcc.446>
- Koks, E. E., Jongman, B., Husby, T. G., & Botzen, W. J. W. (2015). Combining hazard, exposure and social vulnerability to provide lessons for flood risk management. *Environmental Science & Policy*, 47, 42–52. <https://doi.org/10.1016/j.envsci.2014.10.013>
- Kunreuther, H., Heal, G., Allen, M., Edenhofer, O., Field, C. B., & Yohe, G. (2013). Risk management and climate change. *Nature Climate Change*, 3(5), 447–450. <https://doi.org/10.1038/nclimate1740>
- Ledoux, B. (2006). *La gestion du risque inondation*. Éditions Tec & Doc.
- Liverman, D. (2015). Reading climate change and climate governance as political ecologies. In T. Perreault, G. Bridge, & J. McCarthy (Eds.), *The Routledge handbook of political ecology* (pp. 303–319). Routledge.
- Martin, A., McGuire, S., & Sullivan, S. (2013). Global environmental justice and biodiversity conservation. *The Geographical Journal*, 179(2), 122–131. <https://doi.org/10.1111/geoj.12018>
- Matczak, P., & Hegger, D. (2021). Improving flood resilience through governance strategies: Gauging the state of the art. *WIREs Water*, 8(4), e1532. <https://doi.org/10.1002/wat2.1532>
- McCarthy, M. L., Brewster, P., Hsu, E. B., Macintyre, A. G., & Kelen, G. D. (2009). Consensus and tools needed to measure health care emergency management capabilities. *Disaster Medicine and Public Health Preparedness*, 3(S1), S45–S51. <https://doi.org/10.1097/DMP.0b013e31819f4186>
- Mechler, R., & Schinko, T. (2016). Identifying the policy space for climate loss and damage. *Science*, 354(6310), 290–292. <https://doi.org/10.1126/science.aag2514>
- Mees, H. (2017). *Co-producing flood risk governance between authorities and citizens in Flanders and abroad. How 'Co' can we go*. University of Antwerp.
- Mees, H., Crabbé, A., Alexander, M., Kaufmann, M., Bruzzone, S., Lévy, L., & Lewandowski, J. (2016). Coproducing flood risk management through citizen involvement: Insights from cross-country comparison in Europe. *Ecology and Society*, 21(3). <https://doi.org/10.5751/ES-08500-210307>
- Mees, H., Suykens, C., Beyers, J.-C., Crabbé, A., Delvaux, B., & Deketalaere, K. (2016). *Analysing and evaluating flood risk governance in Belgium: Dealing with flood risks in an urbanised and institutionally complex country* [Unpublished project report]. Accessed 4 January 2024 from [https://www.researchgate.net/publication/299967910\\_Analysing\\_and\\_evaluating\\_flood\\_risk\\_governance\\_in\\_Belgium\\_Dealing\\_with\\_flood\\_risks\\_in\\_an\\_urbanised\\_and\\_institutionally\\_complex\\_country](https://www.researchgate.net/publication/299967910_Analysing_and_evaluating_flood_risk_governance_in_Belgium_Dealing_with_flood_risks_in_an_urbanised_and_institutionally_complex_country)
- Munyai, R. B., Nethengwe, N. S., & Musyoki, A. (2019). An assessment of flood vulnerability and adaptation: A case study of Hamutsha-Muungamunwe village, Makhado municipality. *Jamba: Journal of Disaster Risk Studies*, 11(2), 1–8. <https://doi.org/10.4102/jamba.v11i2.692>
- Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology*, 41(1), 127–150. <https://doi.org/10.1007/s10464-007-9156-6>
- O'Hare, P., & White, I. (2018). Beyond 'just' flood risk management: The potential for—And limits to—Alleviating flood disadvantage. *Regional Environmental Change*, 18(2), 385–396. <https://doi.org/10.1007/s10113-017-1216-3>
- Oosterberg, W., Van Drimmelen, C., & Van der Vlist, M. (2005). *Strategies to harmonize urbanization and flood risk management in deltas 45th Congress of the European Regional Science Association*. Vrije Universiteit Amsterdam.
- Orru, K., Klaos, M., Nero, K., Gabel, F., Hansson, S., & Nævestad, T.-O. (2022). Imagining and assessing future risks: A dynamic scenario-base social vulnerability analysis framework for disaster planning and response. *Journal of Contingencies and Crisis Management*, 31, 995–1008. <https://doi.org/10.1111/1468-5973.12436>
- Pahl-Wostl, C. (2019). The role of governance modes and meta-governance in the transformation towards sustainable water governance. *Environmental Science & Policy*, 91, 6–16.
- Paloniemi, R., Apostolopoulou, E., Cent, J., Bormpoudakis, D., Scott, A., Grodzińska-Jurczak, M., Tzanopoulos, J., Koivulehto, M., Pietrzyk-Kaszyńska, A., & Pantis, J. D. (2015). Public participation and environmental justice in biodiversity governance in Finland, Greece, Poland and the UK. *Environmental Policy and Governance*, 25(5), 330–342. <https://doi.org/10.1002/eet.1672>
- Penning-Rowsell, E. C. (2015). Flood insurance in the UK: A critical perspective. *Wiley Interdisciplinary Reviews: Water*, 2(6), 601–608.
- Penning-Rowsell, E. C., Priest, S. J., & King, D. (2016). Flood risk management and 'fairness': Aspirations and reality. *E3S Web of Conferences*, 7, 24001. <https://doi.org/10.1051/e3sconf/20160724001>
- Plate, E. J. (2002). Flood risk and flood management. *Journal of Hydrology*, 267(1), 2–11. [https://doi.org/10.1016/S0022-1694\(02\)00135-X](https://doi.org/10.1016/S0022-1694(02)00135-X)
- Prado, C. (2022). Community participation and recognition justice in border environmental governance. *Journal of Borderlands Studies*, 37(2), 359–377. <https://doi.org/10.1080/08865655.2020.1774407>
- Quandt, A. (2016). Towards integrating political ecology into resilience-based management. *Resources*, 5(4), 31. <https://doi.org/10.3390/resources5040031>
- Santoro, S., Pluchinotta, I., Pagano, A., Pengal, P., Cokan, B., & Giordano, R. (2019). Assessing stakeholders' risk perception to promote nature based solutions as flood protection strategies: The case of the Glinščica river (Slovenia). *Science of the Total Environment*, 655, 188–201. <https://doi.org/10.1016/j.scitotenv.2018.11.116>
- Sayers, P., Horritt, M., Penning-Rowsell, E., & Fieth, J. (2017). *Present and future flood vulnerability, risk and disadvantage: A UK scale assessment. A report for the Joseph Rowntree Foundation*. Retrieved April 6, 2023, from [http://www.sayersandpartners.co.uk/uploads/6/2/0/9/6209349/sayers\\_2017\\_-\\_present\\_and\\_](http://www.sayersandpartners.co.uk/uploads/6/2/0/9/6209349/sayers_2017_-_present_and_)

- future\_flood\_vulnerability\_risk\_and\_disadvantage\_-\_final\_report\_-\_uploaded\_05june2017\_printed\_-\_high\_quality.pdf
- Sayers, P., Penning-Rowsell, E. C., & Horritt, M. (2018). Flood vulnerability, risk, and social disadvantage: Current and future patterns in the UK. *Regional Environmental Change*, 18(2), 339–352. <https://doi.org/10.1007/s10113-017-1252-z>
- Sayers, P., Li, Y., Galloway, E., Penning-Rowsell, E., Shen, F., Wen, K., Chen, Y., & Le Quesne, T. (2013). *Flood risk management: A strategic approach*. UNESCO.
- Schlosberg, D. (2004). Reconceiving environmental justice: Global movements and political theories. *Environmental Politics*, 13(3), 517–540. <https://doi.org/10.1080/0964401042000229025>
- Schlosberg, D. (2007). *Defining environmental justice: Theories, movements, and nature*. Oxford University Press.
- Seidman, I., Rubin, H. J., Rubin, I. S., & Dille, P. (2004). Interviews and the philosophy of qualitative research. *The Journal of Higher Education*, 75(1), 127–132.
- Seijger, C., Ellen, G. J., Janssen, S., Verheijen, E., & Erkens, G. (2017). Sinking deltas: Trapped in a dual lock-in of technology and institutions. *Prometheus*, 35(3), 193–213. <https://doi.org/10.1080/08109028.2018.1504867>
- Sekulova, F., Anguelovski, I., Kiss, B., Kotsila, P., Baró, F., Palgan, Y. V., & Connolly, J. (2021). The governance of nature-based solutions in the city at the intersection of justice and equity [editorial]. *Cities*, 112, 103136. <https://doi.org/10.1016/j.cities.2021.103136>
- Sjöblom, J. (2022). Osallistumisen kulttuuriset resurssit asuinalueen suunnittelussa: Tapaustutkimus Arabian alueen täydennysrakentamisesta. *Yhdyskuntasuunnittelu*, 60(2), 33–52. <https://journal.fi/yhdyskuntasuunnittelu/article/view/109713>
- Snel, K. A. W., Hegger, D., Mees, H., Craig, R. K., Kammerbauer, M., Doorn, N., Bergsma, E., & Wamsler, C. (2022). Unpacking notions of residents' responsibility in flood risk governance. *Environmental Policy and Governance*, 32, 217–231. <https://doi.org/10.1002/eet.1985>
- Taylor, M. (2014). *The political ecology of climate change adaptation: Livelihoods, agrarian change and the conflicts of development*. Routledge.
- Thaler, T. (2021). Social justice in socio-hydrology—How we can integrate the two different perspectives. *Hydrological Sciences Journal*, 66(10), 1503–1512. <https://doi.org/10.1080/02626667.2021.1950916>
- Thaler, T., Fuchs, S., Priest, S., & Doorn, N. (2018). Social justice in the context of adaptation to climate change—Reflecting on different policy approaches to distribute and allocate flood risk management. *Regional Environmental Change*, 18(2), 305–309. <https://doi.org/10.1007/s10113-017-1272-8>
- Thaler, T., & Hartmann, T. (2016). Justice and flood risk management: Reflecting on different approaches to distribute and allocate flood risk management in Europe. *Natural Hazards*, 83(1), 129–147. <https://doi.org/10.1007/s11069-016-2305-1>
- Tyler, J., Sadiq, A.-A., & Noonan, D. S. (2019). A review of the community flood risk management literature in the USA: Lessons for improving community resilience to floods. *Natural Hazards*, 96(3), 1223–1248. <https://doi.org/10.1007/s11069-019-03606-3>
- UN. (2015). Sendai Framework for disaster risk reduction 2015–2030. In *UN World Conference on Disaster Risk Reduction, 2015 March 14–18*. United Nations Office for Disaster Risk Reduction [http://www.wcdrr.org/uploads/Sendai\\_Framework\\_for\\_Disaster\\_Risk\\_Reduction\\_2015-2030.pdf](http://www.wcdrr.org/uploads/Sendai_Framework_for_Disaster_Risk_Reduction_2015-2030.pdf). Accessed 4 January 2024
- Waisel, D. B. (2013). Vulnerable populations in healthcare. *Current Opinion in Anesthesiology*, 26(2) [https://journals.lww.com/co-anesthesiology/Fulltext/2013/04000/Vulnerable\\_populations\\_in\\_healthcare.15.aspx](https://journals.lww.com/co-anesthesiology/Fulltext/2013/04000/Vulnerable_populations_in_healthcare.15.aspx), 186–192.
- Walker, G. (2012). *Environmental justice: Concepts, evidence and politics*. Routledge.
- Walker, G., & Burningham, K. (2011). Flood risk, vulnerability and environmental justice: Evidence and evaluation of inequality in a UK context. *Critical Social Policy*, 31(2), 216–240.
- Whyte, K. P. (2011). The recognition dimensions of environmental justice in Indian country. *Environmental Justice*, 4(4), 199–205. <https://doi.org/10.1089/env.2011.0036>
- Wyns, A. (2023). COP27 establishes loss and damage fund to respond to human cost of climate change. *The Lancet Planetary Health*, 7(1), e21–e22. [https://doi.org/10.1016/S2542-5196\(22\)00331-X](https://doi.org/10.1016/S2542-5196(22)00331-X)
- Zahran, S., Brody, S. D., Peacock, W. G., Vedlitz, A., & Grover, H. (2008). Social vulnerability and the natural and built environment: A model of flood casualties in Texas. *Disasters*, 32(4), 537–560. <https://doi.org/10.1111/j.1467-7717.2008.01054.x>

**How to cite this article:** Paauw, M., Smith, G., Crabbé, A., Fournier, M., Munck af Rosenschöld, J., Priest, S., & Rekola, A. (2024). Recognition of differences in the capacity to deal with floods—A cross-country comparison of flood risk management. *Journal of Flood Risk Management*, e12965. <https://doi.org/10.1111/jfr3.12965>