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Realizing Recognition Justice in Flood Risk Management Policy: A Case Study on Implementation Gaps and Legitimacy Gaps in Austria

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ABSTRACT

Flood risk is often unequally distributed. These inequalities highly depend on socio-political decisions. The recognition of the needs of individuals within a floodplain needs to be considered as a precondition for reaching justice in flood risk management, especially as people differ in their vulnerabilities and capacities to deal with floods. This paper addresses the question of how vulnerable population groups are recognized in flood risk management used in the federal state of Upper Austria. We use a qualitative research method, which is based on policy, legal documents and strategies and on 32 semi-structured interviews conducted at different levels. Even though clearly stating the overall policy goal of reducing social vulnerability and inequality, most risk reduction strategies neglect these aspects, which creates an implementation gap regarding recognition justice. Strict adherence to the principle of equality leads to, among others, uniform design levels and cost contributions that undermine the notion of differentiated vulnerability. By contrast, disaster aid payments do use eligibility criteria that recognize social inequalities. However, even if justice principles are implemented, they lack transparency and accountability, which creates a legitimacy gap. Restricting the role of civil servants in the public administration through hybrid governance may narrow implementation and legitimacy gaps.

1 | Introduction

Environmental justice plays a central role in flood risk management (FRM; Collins et al. 2018; Ciullo et al. 2020; Eakin et al. 2021; de Goer Herve et al. 2023). The term environmental justice has a long history in the United States. For example, the United States Environmental Protection Agency understands the term (until the current government shut down the webpage) as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin,

or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. This goal will be achieved when everyone enjoys the same degree of protection from environmental and health hazards, and equal access to the decision-making process to have a healthy environment in which to live, learn, and work” (EPA 2019). The main questions are who is at risk of flooding and who can effectively recover from flood hazard events is highly diverse within a community (Sayers et al. 2018; Similey 2020; Tyler et al. 2023). Some people can barely cope

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with and adapt to flood events because of their socioeconomic status, physical impairments or other facets of social vulnerability (Collins et al. 2018; O'Hare and White 2018; Lucas and Booth 2020). Low-income communities are more likely to be affected by flood events (Emrich et al. 2020), and their members are less likely to have the capacity to cope with such extreme situations (Cutter et al. 2003; Rufat et al. 2015). Consequently, FRM decision-making needs to consider environmental justice, above all in the question who to support and who not (Shively 2017; Sayers et al. 2018; Thaler et al. 2018; Ciullo et al. 2020; Jafino et al. 2022).

Environmental justice includes three main themes: distributional, procedural, and recognition justice (Walker 2012; Meerow et al. 2019). Distributional justice considers the question of how certain aspects (such as wealth, access to resources, and environmental benefits and detriments) are distributed between the members of a community or the citizens of a country. Within FRM, distributional issues often focus on who pays, who loses, or who gains from risk reduction strategies or policy change (Kaufmann et al. 2018; Liao et al. 2019; Thaler 2021). Procedural justice reflects the question of who participates in the decision-making and planning process and has a say in all steps until an agreement is reached or a decision is made. Within FRM, procedural issues encompass the development or transitioning of new rules and regulations or the design and selection process of flood alleviation schemes (Begg 2018; Begg et al. 2018; Kuhlicke et al. 2020; Thaler 2021). Finally, and the main focus of this paper, recognition justice includes acknowledging and understanding the specific needs, preferences, and interests that arise from individual backgrounds, such as ethnicity, race, gender, religion, disability, among others (Walker 2012; Paaauw, Crabbé et al. 2025; Paaauw, Smith et al. 2025; Wiering et al. 2025). Within FRM, recognition issues concern person-related characteristics that increase or decrease social vulnerability to flooding (Cutter et al. 2003). Distributional, procedural, and recognition justice are closely interlinked and build on each other (Fraser 1995). Recognition justice may be considered a precondition for distributional and procedural justice, as identifying and characterizing those who are vulnerable and marginalized enables designing rules and procedures that effectively remediate their disadvantage (Walker and Day 2012; Jenkins et al. 2016). However, recognition justice receives little attention in academic research, especially to understand and to explain how FRM can be designed in a more inclusive manner (Chu and Michael 2019; Paaauw, Crabbé et al. 2025; Paaauw, Smith et al. 2025). Previous FRM research focuses on distributional and procedural aspects (Penning-Rowsell and Pardoe 2012; Thaler, Doorn et al. 2020; de Goer de Herve 2022).

Gradually, countries across the globe follow the scholarly discourse and adopt environmental justice policy strategies within their FRM protocols. For example, the English Outcome Measures system introduced in 2008 (DEFRA 2007; Johnson and Penning-Rowsell 2010) prioritizes flood alleviation schemes not only by the direct financial and economic losses avoided (i.e., the risk level) but also by the level of the community's deprivation in order to give financially deprived communities precedence in construction schedules. The main reason for this policy was the strong political focus on justice

in the government of Tony Blair (Marshall et al. 2008). By contrast, in most countries, the cost-benefit assessment (CBA) of flood defense structures centers on tangible direct financial and economic losses (Babcicky et al. 2021). This may incur distributional injustice, as high-income communities reach higher CBA ratios because their accumulated individual wealth amounts to higher potential losses (Penning-Rowsell et al. 2005; Emrich et al. 2020). High-income communities may accrue a further edge if they have a strong voice in social networks with local and national policy-makers and can ensure that their individual needs and interests are heard, thereby directing government funding to their benefit and eventually giving rise to procedural injustice (Thaler and Priest 2014; Seebauer et al. 2019).

Environmental justice in FRM should therefore start from a clear understanding of the groups who may receive an unfair advantage or disadvantage (in the above example: High-income vs. deprived communities). If vulnerable groups are neglected or misrepresented in FRM, then recognition justice does not provide the weighting of vulnerable groups to direct distributional justice, and does not name who should have a say in decision-making to support procedural justice. Then, whoever has the "loudest voice" can receive satisfaction of their interests and needs through funding by the central government. The recognition of those who are affected yet marginalized or ignored is a central topic of the environmental justice debate in FRM, and household/individual attributes are used to characterize the most vulnerable among the population (such as gender, age, income; Thaler and Priest 2014; Babcicky et al. 2021). Specifying as well as targeting vulnerable groups seems a critical factor for the environmental justice of an FRM system. However, merely identifying vulnerable groups is not enough (Chu and Michael 2019; Paaauw, Crabbé et al. 2025; Wiering et al. 2025). Recognition justice focuses on understanding individual needs, knowledge, experience to deal with floods as well as identity (Paaauw, Crabbé et al. 2025; Wiering et al. 2025) with the aim to accept "the diversity of perspectives and experiences, conflicting interests and socio-cultural characteristics" (Paaauw, Crabbé et al. 2025, 3) of individuals. Insufficient recognition justice would not respect the individual's social vulnerability and coping capacities, rendering them invisible or even stereotyping or stigmatizing them (Wiering et al. 2025). Thus, in order to achieve recognition justice in FRM policy, it does not suffice to firstly identify and understand vulnerable groups but secondly, they must be operationalized in FRM activities, that is, their needs must be addressed and specified in the rules, criteria and procedures how FRM policy is realized in practice.

The present paper draws on rich qualitative data from document analysis and interviews in the study site of Upper Austria to illustrate how recognition justice manifests across the generic five types of FRM strategies: (1) prevention (e.g., land use planning), (2) defense (e.g., linear protection and retention measures), (3) mitigation (e.g., use of property level flood risk adaptation (PLFRA) measures), (4) preparation (e.g., early warning and community training), and (5) recovery (e.g., disaster-aid financial support; Hegger et al. 2016). After reviewing how vulnerable groups are mentioned in FRM strategies and instruments, we use the analytical lens of

implementation gaps and legitimacy gaps to assess how these mentions enter actual FRM practice. An *implementation gap* refers to the discrepancy between the way social vulnerability is acknowledged and prescribed in policy goals and how it is implemented in FRM rules and instruments. An implementation gap emerges, for instance, if environmental justice is just a pretext or if vulnerable groups are described in vague and ambiguous terms. A *legitimacy gap* refers to actors who enact distributional, procedural, or recognition justice but do not have the statutory power or community standing to do so. A legitimacy gap emerges, for instance, if actors take decisions of public interest who are not democratically elected representatives or if they do not disclose their decision in a transparent manner and are held accountable by said representatives. The legitimacy gap represents the conflict between society's expectations and the actions of public administration within the decision-making process (Lindblom 1994). However, the multi-actor context typical for FRM (Begg 2018) calls for a perspective that goes beyond state authorities on the one hand and concerned citizens on the other hand; thus, to also include nonstate actors, we adopt a hybrid governance framework.

2 | Conceptual Framework: The Role of Hybrid Governance for Closing Implementation and Legitimacy Gaps

Over the past few decades, FRM has shifted from “classical” top-down management towards broader collaboration with nonstate actors (Begg 2018; Kuhlicke et al. 2020). The integration of nonstate actors caused large changes within the FRM system in terms of how decision-making and implementation processes are organized, the use and combination of different state- and market-oriented policy instruments, and the assignment of specific responsibilities to specific actors (Toxopeus et al. 2020; Pirard et al. 2023). These new forms of interaction (e.g., private–public partnerships or co-management; Lemos and Agrawal 2006) have become more common in FRM (van Buuren et al. 2012; Begg et al. 2015; Hermansson 2016). FRM increasingly combines hierarchical (or centralized) and participatory approaches (Anh Tran et al. 2020). *Hybrid governance*, a concept from the economics literature (Toxopeus et al. 2020), describes collaboration between state and nonstate actors where each actor maintains their sovereignty from the others but still works closely together in order to minimize transaction costs (Garrette and Quelin 1993; Toxopeus et al. 2020).

Hybrid governance aims to “bridge state-market-community division” (Lockwood and Davidson 2010, 388). Further, hybrid governance aims to integrate “a participatory approach into the conventional institutional framework to support the operational performance of the scheme” (Anh Tran et al. 2020, 46). In many countries, FRM is highly institutionalized and characterized by a strong hierarchical–engineering decision-making process (Thaler et al. 2018; Leitner et al. 2020; Cook et al. 2025). The goal of hybrid governance in FRM is to overcome the state-nonstate dichotomy and create more effective responses to the current complex challenges (Lockwood and Davidson 2010). However, the broader engagement with nonstate actors includes the question how policy implementation and legitimacy gaps can be improved.

Policy implementation gaps focus on the question why policies fail to be implemented on the ground (Braithwaite et al. 2018; Hudson et al. 2019). One reason is the increased complexity of policy goals and targets (Braithwaite et al. 2018). Other reasons are a lack of policy coordination, unclear assignment of responsibilities, or vague and optimistic goals and targets (Hudson et al. 2019).

Strengthening legitimacy in public policy remains a core point in the governance discussion (Suchman 1995; Bäckstrand 2006; Mees et al. 2017; Alexander et al. 2018). In particular, the involvement of nonstate actors as a response to crises that overwhelm state capacities has increased the need of ensuring the legitimacy of the policy decision-making process. Legitimacy can be distinguished between the assessment of the state and nonstate interaction (input legitimacy), the efficiency and effectiveness of the policy goal (output legitimacy) and a broad-fair participation process (throughput legitimacy; Scharpf 1999, 2000; Mees et al. 2014; Alexander et al. 2018). Therefore, the legitimacy gap focuses on the question of how to improve transparency, ensuring participation within the decision-making process as well as efficiency and effectiveness to reach the policy goals.

Hybrid governance may cut both ways with regard to implementation and legitimacy gaps. Hybrid governance may close implementation gaps because new forms of interaction make it more likely that policy goals are realized in practice, for instance in the co-creation of societal needs (e.g., urban green spaces; Frantzeskaki et al. 2016) or innovative solutions in FRM (Thaler et al. 2022). Hybrid governance may close legitimacy gaps, as it brings more actors into the policy process and offers more opportunities for disadvantaged voices to be heard, for rethinking procedural justice elements in policy design and for facilitating oversight of state actors by civil society organizations (Kotsila et al. 2021).

On the other hand, hybrid governance may also maintain or even widen implementation and legitimacy gaps. Implementation gaps may increase if nonstate actors are too distant and only partially committed to policy goals, and state actors lack leverage to enforce goals on nonstate actors (Thaler and Priest 2014; Begg 2018; Kuhlicke et al. 2020). For example, some nonstate actors might dominate the policy discourse and decision-making process with the aim to push their individual interests at the expense of other, usually less vocal groups. Legitimacy is a core challenge in hybrid governance arrangements (Wenner 2021; Pirard et al. 2023). A stronger role of nonstate actors may go hand in hand with a societal shift to privatization of risk and neoliberal thinking (Kuhlicke et al. 2020; Toxopeus et al. 2020). Privatization shifts the risk discourse from the public space to contract negotiations behind closed doors, thereby impairing transparency and accountability.

3 | Method

This paper studies how recognition justice manifests in the FRM practice of the study site Upper Austria. Across five generic types of FRM, we assess the presence of implementation and legitimacy gaps and how they interact with hybrid governance.

3.1 | Study Site

Upper Austria, one of nine federal states or provinces in Austria, is located in the northwest of the country, bordering Germany and the Czech Republic, and covers an area of approx. 12,000 km² and a population of around 1.5 million inhabitants. Areas at risk of flooding in Upper Austria, in particular alongside the Danube River, include industrial zones with heavy industry such as machine building or production of construction materials, farmland as well as a high share of exposed residential buildings (Fuchs et al. 2015; Schober et al. 2015; Dolejs et al. 2022). Upper Austria has been affected by various large and small flood events in the past decades. The 2002 and 2013 Danube floods resulted in large socioeconomic losses and damages; for instance, the 2013 flood affected 706 households and incurred overall damages of €41 million (Habersack and Moser 2003; Blöschl et al. 2013, 2015; BMVIT 2015). Besides riverine floodplains, mountainous and hilly regions are affected by torrential and groundwater/pluvial flooding, respectively (Habersack and Moser 2003). In light of these recurrent flood hazards, Upper Austria invested extensively in various risk reduction strategies, for instance detailed risk management plans for areas of potential significant flood risk, the 36.4 km large Machland dike or the 2.6 mio. m³ capacity flood storage in Krems-Au (Schwingshandl et al. 2013; Seher and Löschner 2018; RIOCOM 2021; Land Oberösterreich 2023; Machlanddamm 2023).

Analyzing the realization of recognition justice in FRM policy requires a detailed perspective on how FRM policy is put into practice. The present paper selects Upper Austria as a study site for several reasons: (1) The federal state is the governance level in Austria where most FRM responsibilities and competencies are allocated. (2) Upper Austria faces a historically ongoing threat of a wide range of fluvial, torrential, and pluvial flooding. (3) The Upper Austrian FRM strategy addresses all five types of FRM (prevention, defense, mitigation, preparation, recovery) and includes highly contested schemes such as planned relocation. (4) Many facets of the Upper Austrian FRM system are similar to other affluent regions in Western Europe (Begg et al. 2018) and beyond. Thus, Upper Austria seems well-suited for illustrating how FRM activities raise manifold environmental justice issues, in particular in terms of becoming aware of vulnerable groups and recognizing their specific needs (Paauw, Crabbé et al. 2025; Paauw, Smith et al. 2025; Wiering et al. 2025).

3.2 | Data and Analytical Approach

The paper uses a qualitative research method combining document analysis with actor interviews. The interviews complement the document analysis by confirming that all relevant documents are included, eliciting background information and assessing informal practices that are not covered in publicly available written sources. Policy documents and laws were assessed on how they recognize justice (full list of policy documents can be seen in Appendix A). Qualitative semi-structured interviews were conducted with 32 experts and policy-makers who are responsible for FRM policy at the national, regional, and local governance levels. Interviewees were selected based on their mention in policy documents as responsible for the

design or implementation of FRM strategies; subsequent snowball sampling ensured coverage of relevant actors without formal or expert roles. The interviews were conducted in German between 2016 and 2023, face-to-face, over the telephone, or online, lasting between 25 and 60 min each. The interviews were conducted as part of various research activities in Upper Austria; as the relevant actors and the main strategies and instruments remained unchanged over the last decade, the present paper collates interview transcripts that had been published in our earlier works (Thaler, Seebauer et al. 2020; Seebauer et al. 2023), for re-analysis and extends them by more recent interviews. Each interview was transcribed, averaging 4–8 pages for each transcript. We use pseudonyms (e.g., i1, i2, i3, ... iX) to ensure interviewee anonymity. The full list of interviewees can be seen in Appendix B.

Both document analysis and actor interviews measured recognition justice as (a) the definition of different vulnerable groups within the different policy strategies, (b) the governance arrangements in each type of FRM, (c) the consideration of vulnerability criteria in the implementation of FRM strategies, and (d) the legitimacy of each strategy in terms of participation, deliberation, and decision-making. Interview coding adopted a grounded-theory approach (Strauss and Corbin 1998) on an iterative basis using the framework of implementation gaps, legitimacy gaps, and hybrid governance, and was further refined through the analytical process (Dougherty 2017).

4 | Results

4.1 | Recognition of Vulnerable Groups in the Upper Austrian FRM System

The Upper Austrian FRM system includes a wide range of different rules, policy strategies, and actors at the national, regional, and local levels. Across interviewees and policy documents, there is no overarching justice framework or directive within the national Austrian or the regional Upper Austrian FRM system (i1; i2; i17; i18; i20; i21; i22). Virtually all policy-makers agree with the general goal of justice; however, officially, the public administration largely fails to recognize vulnerable groups within the decision-making process. The interviewees emphasize that justice plays an important role, but remain vague about how justice is defined and implemented. Policy documents yield a similar picture; the National Climate Change Adaptation Strategy (NAS 2012; BMNT 2017) highlights social cohesion and vulnerable groups in its own chapter, but does not detail how these should be considered in the specific measures it lists in its action plan.

The main reason for this discrepancy lies in the policy challenge of providing equivalent support to all citizens on the one hand and targeting specific vulnerable groups on the other hand. The constitutional imperative of treating all citizens equally guides the decision-making in all five types of FRM (i1; i2; i3; i4; i5; i10; i11; i12; i13; i14; i15; i18). Taken in the strict legal sense, this imperative translates into equal risk reduction throughout the country, which precludes any prioritization of FRM activities or any recognition of the special needs of different

vulnerable groups. The principle of equality restricts the provision of vulnerability-based risk management approaches, such as variable support levels based on the individual needs and circumstances of those who agree to relocate from the floodplain (i3; i4; i5; i24; i25; i26). Some interviewees front the equality argument to avoid possible lawsuits: If FRM were prioritized by social vulnerability, those classified as less vulnerable might sue for unfair treatment; however, if everybody receives equal support, such complaints cannot arise (i1; i2). The combination of vague policy goals for environmental justice with strict adherence to the principle of equality sets the stage for ensuing implementation gaps when these vague policy goals fail to direct FRM instruments.

4.2 | Implementation Gap of Recognition Justice Within the Upper Austrian FRM System

In addition to the official policy documents, legal frameworks and directives, we identify various unwritten or officially published justice criteria in the decision-making and implementation process of FRM strategies. Analyzing the generic five types of FRM (Hegger et al. 2016), namely, (1) flood risk prevention, (2) flood defense, (3) flood risk mitigation, (4) flood preparation, and (5) flood recovery, we observe a wide set ranging from no criteria to a clear list of various vulnerability criteria used in decision-making (see also Table 1).

4.2.1 | Flood Risk Prevention

The prevention strategy in the Upper Austria FRM policy focuses on spatial planning and planned relocation. The key governance actor for implementing spatial planning is located at the local level (i2; i10; i14; i27; i28; i29) and oversight is provided by the regional or national authorities (i2; i14; i15). Prevention includes restricting the construction or extension of buildings in flood risk zones to reduce exposure, and thereby infringes on how private landowners may exercise their property rights (i1; i2; i10; i11; i12; i24; i25; i26; i27; i28). However, the public administration largely hesitates to intervene on privately owned land and instead relies on voluntary acceptance or on housing market mechanisms. A hybrid governance setting is formed to increase the motivation of individuals to take flood-proofing actions on their own properties and buildings to effectively reduce the risk level for potential future flood events. On the Danube floodplain, planned relocation is designed and implemented for everyone equally (i1; i2). The decision about who is eligible for relocation compensation payments is solely based on hydrological modelling. Everybody is offered the same level of compensation; those who agree to relocate receive 80% of the building value and 80% of the demolition costs, paid by the public administration. Social factors and special needs in coping with the relocation are ignored by the public administration. Any differentiation is rather seen as a risk for political protest (i1; i2).

TABLE 1 | Overview of the recognition of justice in the most important instruments used in Upper Austria FRM policy.

Type of FRM	Instrument	Governance actor responsible for implementation	Consideration of vulnerable groups
Risk prevention	Spatial planning	Mayor under provincial oversight	None
	Planned relocation	National and regional authorities	None
Defense	Linear riverside structures	National and regional authorities	High value assets are prioritized; vulnerability is included as qualitative criteria
	Flood storage at the upper part of the catchment	National and regional authorities	High value assets are prioritized; vulnerability is included as qualitative criteria
Risk mitigation	Obligations for property-level protection (PLFRA) measures	Mayor	None
Preparation	Early warning	Fire brigades	Informally if people with special needs are locally known
	Moving assets above water level	Fire brigades	Informally if people with special needs are locally known
Recovery	Catastrophe funds	Provincial administration	Formal criteria by family situation, income, debt and special needs
	Private donations	Committee headed by mayor	Informal criteria
	Workforce in cleanup and repair	Fire brigades, army, volunteers	Informal criteria
	Insurance	Insurance companies	At best considered on a case-by-case basis

4.2.2 | Flood Defense

The defense strategy in the Upper Austria FRM policy mainly constructs technical mitigation measures, such as dams, check dams for mountainous catchments, or flood storage in the upper part of catchments. In flood defense, implementation gaps result from guidelines in cost-benefit analysis and from standardized design levels. The selection process for projects is based on the outcomes of a cost-benefit analysis (CBA; i14; i15; i17). Construction costs are compared to the avoided direct monetary losses in physical structures such as buildings, infrastructures, and nonresidential properties caused by a 100-year or 150-year flood event (BMLFUW 2016; WLV 2006). Projects with a positive benefit-cost ratio are realized eventually, as there is often no prioritization in terms of who gets a flood alleviation scheme first (i15). Social vulnerability factors, such as the number of people affected or co-benefits for human well-being, enter the CBA calculation based on a qualitative method and play a minor role in the overall assessment (i14; i15).

Technical mitigation measures for flood defense have a standardized design level of a 1:100-year return period for river floods and 1:150 for torrential floods, which includes those communities and individuals living within different risk levels reaching the same standardized design level (i14; i15). Up to 80% of the construction costs for this design level are carried by the national and regional authorities; the rest needs to be paid by the local authorities or other adjacent beneficiaries of the technical measure, such as private companies, state-owned road and railway providers, or electrical grid operators, or individual residents (i14; i15). If a municipality or private party desires a higher protection level, for instance, to protect particularly vulnerable people and assets, they would have to pay for it out of their own budgets, which they usually cannot afford. Small rural communities often struggle to even make their 20% minimum cost contribution, which puts them at a disadvantage compared to more affluent communities, which can afford better flood alleviation schemes that allow settlement development that attracts new residents and businesses and subsequently strengthens the tax revenues of already wealthy communities. In rare cases, flood alleviation schemes with higher design levels are realized when large businesses invest in conjunction with the public administration to provide flood protection for a 1:400-year return period (i15). However, the decision about technical mitigation measures in terms of design, location, etc. is based on engineering-top-down criteria. Individual needs or interests are largely neglected within the decision-making process.

In a case of pluvial flood storage in the Aist river catchment, located in northern Upper Austria, hybrid governance enables recognition justice in flood defense by balancing the interests of upstream and downstream communities in the same catchment. Downstream communities profit from reduced risk, but upstream communities have to implement the construction of retention basins, acquire land from private property owners, and convince farmers to adopt less soil-compacting cultivation techniques. The regional flood board of the Aist river brings together 27 municipalities along the river course and negotiates larger financial contributions from downstream communities

(i10; i11; i12; i13; i14; i15). This policy shift from each community funding for itself towards a regional (catchment-wide flood risk management strategy) collaboration—which began in the early 2000s—also involves private landowners because they may block the entire implementation process if they refuse to provide the properties foreseen in the construction plans drafted by the regional authorities (i18).

4.2.3 | Flood Risk Mitigation

A mitigation strategy is mostly absent in Upper Austrian FRM as the core strategy relies on flood defense and protection (i10; i11; i12; i13; i14; i15). The Mayor's mandate PLFRA measures if new buildings are erected in flood risk zones. However, flood mitigation is not implemented with regard to existing buildings which constitute the majority of the building stock. The main reason for a lack of flood risk mitigation measures is a lack of political will and legislative power to enforce large-scale implementation of PLFRA measures for privately owned residential and non-residential buildings. Thus, PLFRA measures are only implemented voluntarily by the private owners. Further, there exists no financial support by the public administration for PLFRA measures.

4.2.4 | Flood Preparation

The preparation strategy in the Upper Austria FRM policy includes recognition justice in emergency management practices. Local disaster management plans often include (formal or informal) address lists of vulnerable people so that blue light organizations may provide special support in a flood emergency, such as evacuation of people with reduced mobility, medical supplies, or special requirements for temporary shelter (i3; i4; i8; i9; i10; i11; i12). Here, in contrast to flood risk prevention, defense, and risk management, we cannot observe an implementation gap.

4.2.5 | Flood Recovery

The strongest recognition of justice can be observed in the recovery strategy of the Upper Austria FRM policy; here, social vulnerability criteria are defined and implemented. In recovery, damage payments are provided by private insurance, donations, and, most prominently, the public catastrophe funds. Payments from these three sources are tallied so that no beneficiary receives more than 100% of the total damage (i20; i21; i22). In the case of insurance, private insurance companies throughout Austria do not offer insurance conditions that are differentiated between vulnerable groups and do not consider social vulnerability in the administration of damage payments.

In the case of donations, there are generally no formal regulations or directives by public authorities on how to distribute the funds raised (i20; i21; i22). Donation inflow is highly dependent on the severity of the flood event and the level of media presence. Local authorities usually convene an ad-hoc committee that defines vulnerability criteria such as income, family

situation, number of children, or number of dependent parents. Donation payments are distributed to local residents according to these criteria.

In the case of the catastrophe fund (Republik Österreich 1996), the regional authority follows formalized rules. The level of compensation provided by the public administration includes a minimum damage level (€ 1000, with exceptions made for low-income families) and is aimed at covering between 20% and 100% of the total damage. The level of compensation is adjusted by (a) the family situation (e.g., single parents, the number of minors or other dependent family members), (b) the level of damage (damages of more than € 2500 qualify for higher payments), (c) the level of income (families with incomes of less than € 3000 qualify for higher payments), (d) individual debts (those with higher debts qualify for higher payments) and (e) further vulnerability indicators, such as people with special needs (for whom the payments increase by approximately 2%–8%), health issues (which increase the payments by approximately 2%–8%) or other aspects (i20; i21; i22). However, the level of compensation and the vulnerability criteria highly depend on political will, which also shifts over the years, affecting the compensation percentage and what qualifies for compensation (i20; i21; i22).

In addition to the provision of financial compensation, the recovery phase includes the workforce in cleanup and repair efforts, which are mainly organized by the citizens themselves. Here, neighborhood and family support play a crucial role. Blue light organizations, military units or volunteers from non-affected regions support the households, but mainly only in the first hours or days after the event; afterwards, the households have to manage on their own. Here, recognition justice follows informal criteria at best, similar to emergency management practices and the distribution of private donations.

4.3 | Legitimacy Gap of Recognition Justice Within the Upper Austrian FRM System

We next turn to legitimacy gaps in FRM, that is, insufficient transparency or accountability of those who implement FRM strategies. Judging from how decisions in FRM prevention and defense that affect vulnerable groups are codified in the national and federal rule of law, these decisions do not underlie any legitimacy gaps.

4.3.1 | Flood Risk Prevention

Zoning decisions in spatial planning or budget assignments for the construction of flood protection are passed by democratically elected national, regional, and municipal councils (i1; i2; i23; i24; i25). Civil servants in the public administration are controlled by members of the government. The actors who design and administer the various policy instruments in the Upper Austrian FRM system are democratically elected or under public oversight (i16; i17; i18). Citizens living near construction sites have consultation rights or legal standing in the approval proceedings (i27; i28; i29; i30; i31; i32).

4.3.2 | Flood Defense

Legitimacy in flood defense is frequently circumvented or downplayed. In planned relocation, mayors experience substantial pressure from regional authorities (i3; i4; i5). Co-creation of flood alleviation schemes in the sense of sincerely discussing citizens' objections or alternatives to planned schemes has only recently started to take hold (Seebauer et al. 2023). In most cases, citizen participation is restricted to one-way information provision, and citizen advocacy groups are rather seen as nuisances that need to be silenced in the public arena than as a deliberative partner, which misrecognizes the different needs and interests of individuals with the consequence of disengaging these citizens from the FRM decision-making process (i2). This misrecognition also leads to procedural injustices. Legitimacy gaps also arise if justice-relevant decisions are technically taken by local policy-makers, but pre-defined by the regional administration (i3; i4; i5). Long-standing civil servants use their institutional power and knowledge advantage to present their design considerations as the best available or even as the only option, leaving little leeway for modification and withholding informed choices from policy-makers (i2; i20; i21; i22; i24; i25; i26). However, local policy-makers also willingly outsource FRM decisions to the administration in order to avoid responsibility and pass on the blame for ambivalent and unpopular decisions (Seebauer et al. 2023).

In the upstream-downstream collaboration for establishing pluvial flood storage, legitimacy gaps arise from a lack of transparency in financial compensation for private land owners who provide a piece of their land (i21; i22; i23). There exists no compulsory purchase policy in Upper Austria for the realization of flood storage (i10; i14; i15). Consequently, individual contracts are negotiated with the respective landowners, resulting in different and not transparent information about the levels of compensation among flood storage projects across the region and an overall loss of democratic control (i10; i14; i15). This relates to a general lack of transparency in Austria; public officials hold a deeply ingrained mindset to withhold administrative processes from public scrutiny, that has only slowly started to shift toward open governance principles (Seebauer et al. 2023; Transparency International Austria 2023).

4.3.3 | Flood Risk Mitigation

In mitigation FRM, PLFRA measures for new buildings may be mandated by the mayor as the local building authority who issues a building license after direct talks with the building developer. Any other PLFRA measures are undertaken by residents on a voluntary basis (i10; i11; i12). We therefore do not observe a legitimacy gap in the mitigation type of FRM.

4.3.4 | Flood Preparation

In preparation FRM, the fire brigades recruit their members from the local population, which strengthens their legitimacy as local needs and vulnerabilities are well-known to those who deploy during flood emergencies (i10; i11; i12). However, some vulnerable groups are systematically underrepresented among

the membership of fire brigades and other volunteer emergency services, foremost women (as of 2022, 8.8% of Austrian firefighters are female; Bundesfeuerwehrverband 2023) and people with a migration background (Balas et al. 2015).

4.3.5 | Flood Recovery

In recovery, regarding the payout of the catastrophe funds and of donations, those who manage the payment can be considered legitimized: either because they are civil servants under governmental oversight, or because committees for distributing private donations within an affected community are typically headed by the mayor who is advised by other community leaders (i24; i25; i26). However, the core legitimacy problem is that the eligibility criteria are not publicly known. Therefore, there is no accountability for whether payments are assigned in line with these criteria, and vulnerable groups cannot state a legal claim if they doubt whether they receive the payments they are entitled to.

5 | Discussion and Conclusions

Implementation and legitimacy gaps occur in various FRM strategies in Upper Austria. Implementation gaps occur in the prevention, defense, and mitigation stages, whereas in the distribution of workforce and money during the preparation and recovery stages, vulnerable groups are well recognized. Legitimacy gaps occur across all types of FRM, except preparation, mostly from a lack of transparency and accountability. However, implementation gaps and legitimacy gaps are not clear-cut, but rather come in many nuances depending on scope, severity, and the specific role of hybrid governance.

The main source of the observed implementation gap in the Upper Austrian FRM is the strict application of the equality principle. The equality principle manifests in uniform rules, for instance in identical cost contributions and design levels for all flood alleviation schemes. When applied in the literal sense, the equality principle undermines the notion of differentiated vulnerability, as poorer households receive the same support and risk reduction as richer households (Ciullo et al. 2020). Possibly, resorting to the equality principle is used as an excuse for circumventing difficult debates on who needs which risk reduction strategy and how much public support. However, if these debates do not take place, the FRM system ultimately favors those with money, property, and political power. However, as a positive example, the local disaster management plans in Upper Austria do include the different vulnerabilities, critical and societal infrastructures similar to other European countries like England, Finland, Flanders, and France (see also Paauw, Crabbé et al. 2025).

The key source of the legitimacy gap in the Upper Austrian FRM is the strong role of civil servants in the public administration. The asymmetric distribution of knowledge and power between the public administration and citizens, as well as the lack of transparency on FRM processes, allows civil servants to implement FRM policies with little accountability. It seems that, to some degree, this ambiguity is intended by policy-makers in

order to maintain political room for maneuver or to avoid legally enforceable claims. This leads to the conundrum that those who are legitimized to set rules for recognition justice do not legitimize the current ambiguous rules. The public administration in Upper Austria tends to misunderstand, overlook, or even neglect the specific needs of individuals, which can be observed also in other European cases (Paauw, Crabbé et al. 2025; Wiering et al. 2025). This again highlights the role of policy strategies that recognize differentiated vulnerabilities and mandate transparency in the decision-making process (Paauw, Crabbé et al. 2025; Paauw, Smith et al. 2025; Wiering et al. 2025).

Hybrid governance might be a way forward in mitigating implementation and legitimacy gaps. Hybrid governance foresees strong collaboration between state and nonstate actors, bringing together the different rules and instruments from both sides (Ahn Tran et al. 2020; Pirard et al. 2023; Ziegert and Sotirov 2024). Hybrid governance can reduce the legitimacy gap, but only if different nonstate actors are involved within the FRM system. Hybrid governance can encourage stronger social participation, which would also bring the different needs of vulnerable groups to the fore. Subsequently, the social inclusion of these groups may reduce the implementation gap in FRM (Paauw, Crabbé et al. 2025; Paauw, Smith et al. 2025; Wiering et al. 2025). The different needs, vulnerabilities, and capacities to deal with floods of specific groups are well known across European countries (Rufat et al. 2015; Babicky et al. 2021). Here, hybrid governance may facilitate that this academic knowledge is actually taken up by the public administration and that ingrained administrative procedures are revised in the light of the recent debate on recognition justice.

Recognition justice plays a crucial role in FRM. However, most countries across the globe have no official rule-based system for how to integrate justice into the policy-making and implementation process (Paauw, Crabbé et al. 2025; Wiering et al. 2025). There are few countries, such as England and Wales, that include justice in their FRM systems and give policy directions on how to consider it (Johnson and Penning-Rowsell 2010). Therefore, recognition justice (Chu and Michael 2019; Wiering et al. 2025) needs to go beyond stating policy goals for environmental justice, and these goals need to be translated into binding and universal rules (Chu and Michael 2019; Paauw, Crabbé et al. 2025; Paauw, Smith et al. 2025; Wiering et al. 2025). However, recognition justice also requires transparency and has to transcend the discretionary power of civil servants to establish parliamentary oversight (legitimacy of action; Wiering et al. 2025). Based on the case of Upper Austria, we must assume that civil servants do not always act in a neutral and fair manner but rather take discretionary decisions that are colored by their value orientations and that might disadvantage vulnerable individuals. Hybrid governance could narrow these gaps as long as the role of nonstate actors remains within democratic guardrails.

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Data Availability Statement

The data that support the findings of this study are not publicly available due to privacy or ethical restrictions.

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Appendix A

List of Analysed Policy and Legal Documents

Level of governance	Type of documents
National	<ul style="list-style-type: none"> • Austrian Disaster Act 1996 • Forestry Law 1975 • Water Act 1954 • Hazard Zoning Decree 2014 • Guidelines for demarcating hazard zones for the National Water Engineering Administration—Ministry for Agriculture, Forestry, Environment and Water Management 2006 • Technical guidelines for the Austrian Service of Torrent and Avalanche Control—Ministry for Agriculture, Forestry, Environment and Water Management 2006 • Guidelines for hazard zoning—Ministry for Agriculture, Forestry, Environment and Water Management 2011 • Technical guidelines for hazard zoning according to §42a Water Act—Ministry for Agriculture, Forestry, Environment and Water Management 2016 • National Flood Risk Management Plan – Ministry for Agriculture, Forestry, Environment and Water Management 2016 • Technical guideline for the Federal Waterway Administration—Ministry for Transport, Innovation and Technology 2010 • 15a agreement among the federal state and the states of Lower Austria, Upper Austria and Vienna concerning flood protection along the river Danube 2007
Regional	<ul style="list-style-type: none"> • Building Code 1994, Upper Austria • Disaster Act 2016, Upper Austria • Law on Funding Hydraulic Structures 1985 • Provincial Planning Program 2017, Upper Austria • Spatial Planning Act 2014, Lower Austria

Appendix B

List of Interviewees

No.	Interviewee	2016	2020	2021	2023
i1	National authority	x			
i2	Regional authority	x			
i3	Local authority	x			
i4	Local authority	x			
i5	Local authority				
i6	Regional authority		x		

No.	Interviewee	2016	2020	2021	2023
i7	Regional authority		x		
i8	Local authority		x		
i9	Regional authority		x		
i10	Local authority			x	
i11	Local authority			x	
i12	Local authority			x	
i13	Local authority			x	
i14	Regional authority			x	
i15	Regional authority			x	
i16	NGO				x
i17	National authority				x
i18	National authority				x
i19	NGO				x
i20	Regional authority				x
i21	Regional authority				x
i22	Regional authority				x
i23	NGO				x
i24	Regional authority				x
i25	Regional authority				x
i26	Regional authority				x
i27	Local authority				x
i28	Local authority				x
i29	Local authority				x
i30	Local authority				x
i31	Local authority				x
i32	Local authority				x