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Paradoxes of financial schemes for resilient flood recovery of households

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Abstract

Flood resilience (resilient flood risk management), which has been repeatedly demanded, can be achieved through the phases of the risk management cycle. There is a vast body of literature on adaptation, disaster risk reduction measures, and effectiveness of prevention, seen through the lens of postdisaster recovery, but oftentimes the existing literature seems to underestimate the impact of financial flood recovery schemes on resilient recovery of individual households in particular. This contribution focuses on how financial schemes for flood damage compensations—their sources, design, and timing—shape the resilience of recovery of individual households. It discusses the dilemma of recovery of whether recovery schemes should be used strategically to increase resilience, or rather serve early restoration needs, equality access issues, and so on. This contribution seeks to unify the current fragmented academic debate on household resilient recovery by focusing on the ambiguous role of financial recovery schemes.

This article is categorized under:

Engineering Water > Planning Water

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KEYWORDS

compensations, flood damages, flood resilience, recovery

1 | INTRODUCTION

In the wake of increasing flood risks (IPCC, 2018), floods being among the most expensive natural hazards (Munich Re, 2018), resilience has become a much debated concept in flood risk management (FRM; Fekete, Hartmann, & Jüpner, 2019; Hegger et al., 2016; Kuhlicke et al., 2020a). Resilience is currently discussed for its application in the different phases of the FRM cycle (Disse, Johnson, Leandro, & Hartmann, 2020; Schelfaut et al., 2011), from various perspectives, such as hydrological engineering (Pohl, 2020) and political science (Dewulf et al., 2019), and for its diverse aspects, such as critical infrastructure (Fekete, 2019) or pluvial flooding (Rosenzweig et al., 2018). Resilience is a fuzzy concept—it is not defined in a generally and commonly accepted way (Baggio, Brown, & Hellebrandt, 2015; Brand, 2007; Disse et al., 2020; Fekete et al., 2019; Hegger et al., 2016).

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Etymologically, resilience is derived from the latin word “resilire,” which means “bouncing back” (Alexander, 2013), which means the ability of a system to absorb shocks (Holling, 1973). This article defines resilience in line with Tobin (1999), p. 4: “Resilient communities are defined as societies which are structurally organized to minimize the effects of disasters, and, at the same time, have the ability to recover quickly by restoring the socio-economic vitality of the community.” Considering this, flood recovery is central to resilience to prepare individuals and communities to future events and to ensure also a “bounce forward” of them (see e.g., Linkov & Palma-Oliveira, 2017; Pohl, 2020). However, the crucial role of resilience in flood recovery financial schemes is largely neglected in academic and professional debates (Hartmann, van Doorn-Hoekveld, van Rijswick, & Spit, 2019; Pohl, 2020). Whether (or how) financing of private housing reconstruction contribute to resilience depends on various challenges and it is far more complex to reach it. Thus, this article aims at providing different perspectives on financial schemes for the reconstruction of private housing and highlighting three existing paradoxes relevant for the future debates on financial schemes for resilient recovery: the policy paradox, flood damage compensation paradox, and the social equity paradox. The article synthesizes and re-structures recent on-going discussion on the role of financial recovery schemes and offers questions for the future research.

2 | HAZY BOUNDARIES OF RESILIENT RECOVERY

Recovery from disasters can be considered as the “differential process of restoring, rebuilding, and reshaping the physical, social, economic and natural environment through pre-event planning and postevent actions” (Smith & Wenger, 2007, p. 237). This view is applied to flood recovery that is described as returning to “normal” in a timely and efficient manner (Liao, 2012) and disconnected from prevention and mitigation efforts (Rumbach, Makarewicz, & Németh, 2016). However, this traditional outlook has been subject to frequent criticisms. It was revealed that a quick return to preflood state (labeled as “normality”) may factually increase the vulnerability of affected communities (Drennan, McGowan, & Tiernan, 2016; Sandink, Kovacs, Oulahen, & Shrubsole, 2016). Numerous authors have proven that contrary to what was previously acknowledged, the flood recovery period has a much greater potential to reduce vulnerability (Moatty & Vinet, 2016) and that well-designed flood recovery (financial) mechanisms can significantly increase resilience (Suykens, Priest, van Doorn-Hoekveld, Thuillier, & van Rijswick, 2016).

This brings us to *resilient flood recovery* that struggles with both conceptualization and understanding of “resilience,” as mentioned previously. In the policy document language, resilient recovery in general is frequently addressed, and it is described as “recovery efforts that don’t just reconstruct pre-existing conditions but also addresses underlying risk and builds back better. This includes preparedness for recovery, early recovery, which helps facilitate the shift from relief to recovery; and long-term recovery, which encompasses the multi-year process of returning to sustainable development” (UNDP, 2020). This means that disaster risk reduction measures need to be integrated into post-disaster recovery. In the literature, the term “resilient (flood) recovery” is rarely used. Instead, the authors address flood resilience or adaptation during a recovery phase by referring to “build-back better” (Joakim, 2011; Thomalla et al., 2018) or “bounce forward” (Disse et al., 2020).

The period of flood recovery brings the opportunity for more transformative changes in society (Crozier et al., 2016; Thomalla et al., 2018). However, financial instruments and spatial plans need rapid adjustments to encourage more adaptation. After a flood, the immediate need to help affected people overrides claims for vulnerability reduction for future flood risks (Slavíková, 2018). In addition, exceptional governmental aid programs or voluntary donations have limited spending time, leading to a feedback loop that can ultimately increase flood risks (Hartmann, 2011). Therefore, even if risk-reduction incentives, such as standard retrofitting of buildings or voluntary property acquisitions are promoted (Muñoz & Tate, 2016; Suykens et al., 2016), resilient flood recovery usually takes longer than repairing damages. Implementation of financial schemes for resilient flood recovery of households is thus surrounded by numerous paradoxes leading to decision-making dilemmas.

3 | PARADOXES OF RESILIENT FLOOD RECOVERY

There are three major paradoxes of resilient flood recovery: they entail governmental, financial, and social aspects.

3.1 | Policy paradox

Which financial schemes can help to achieve resilient flood recovery? Resilient flood recovery entails implementing adaptation measures. Especially for individual households there are many such measures available (see Attems, Thaler, Genovese, & Fuchs, 2020). A typical claim is that insurances could set incentives for adaptation by providing reduced premiums in return for realizing respective measures. However, there is only a small amount of evidence on how natural hazards insurance markets can effectively contribute to risk reduction (Botzen, 2018; Hudson et al., 2020). In the recovery phase, when there is an opportunity to (re)build more adapted, resources for recovery are available. Those resources shall be granted conditionally by public authorities, only if more adaptive measures are implemented during the reconstruction. However, this is barely happening; despite this, there are exceptions where adaptation is integrated into flood recovery (Thaler & Fuchs, 2020). Thus, what exactly hinders resilient flood recovery financing?

There is a difference in how financial recovery schemes deal with the private and public realm, leading to a paradox. It starts with the relatively slow adaptation against rather quick rebuilding. While rebuilding is often much easier, adaptation implies more time and is considered more complicated. Nonetheless, while high damages on private properties would call for adaptation measures there, oftentimes, flood recovery financing focuses on quickly building back the pre-flood land uses on private properties. The paradox unfolds thus as a conflict between quick recovery of private properties and the need to more time-consumingly adapt the same properties. This results in resilience mainly on the public realm. This juxtaposition is, to some extent, unfair and only partially mirrors the more nuanced reality, but the academic debate hints at this paradox.

The literature on resilience and the case studies conducted by researchers predominantly investigated the public realm, such as infrastructure or adaptation of public places (Berke & Campanella, 2006; Hartmann, van Doorn-Hoekveld, et al., 2019; Knieling & Müller, 2015; Mees, Tempels, Crabbé, & Boelens, 2016; Van der Vaart, Gwenda, Elen-Maarja, Britta, & Melanie, 2015). In these areas, implementing measures, such as discharge fumes, semi-permeable surfaces, and floodable playgrounds is much easier than on private land (Hartmann, Slavíková, & McCarthy, 2019). In addition, Tarlock (2012) describes how the institutional system of property rights frustrates resilience in two ways in most countries of the Global North: First, the legal and political systems in most countries create the expectation that victims of disasters will be supported to recover as close as possible to the original state through public funds, voluntary donations, or insurance payouts; second, the protection of property encourages land-use practices that increase vulnerabilities (Kelly & Brown, 2018; Tarlock, 2012). These effects create moral hazards and ultimately lead to lock-in situation in a nonresilient flood recovery schemes (Needham & Hartmann, 2012).

It is understandable and plausible that after a (flood) event, policymakers, and politicians—particularly, for their electorate—must rebuild for a swift return to normality (despite of the debate what “normal” is, see Medd et al., 2015), particularly for their electorate's benefit. However, a quick return to normality (i.e., quick bouncing back) comes at the cost of resilience (i.e., bouncing forward). This has been proven in numerous flood events in the past decades (Fuchs et al., 2017; Hartmann, 2011; Petrow, Thieken, Kreibich, Merz, & Bahlburg, 2006; Raška, Stehlíková, Rybová, & Aubrechtová, 2019).

The policy paradox of resilient recovery can be summarized as the wish to rebuild the preflood situation in a quick return (Mika & Kelman, 2020). The short-term motivation of decision makers drives financial schemes that support the quick building back of private properties as well as providing basic needs, such as shelter, water, food, and so on, which the society also demands this. Psychological and physical needs request long-term support, which is widely accepted by postdisaster management (Davis, 1978). This rapid rebuild often creates a situation where the recovery does not change the vulnerability which created the risk (Hülssiep, Thaler, & Fuchs, 2020; Mika & Kelman, 2020; Wisner, Blaikie, Cannon, & Davis, 2004). Consequently, recovery can take a long-term perspective with a focus on nonlinear and open-ended development process instead of a linear perspective of vulnerability reduction with the classical understanding of return to normal (Mika & Kelman, 2020). Therefore, policy need to overcome the dilemma to “go back to normal” more towards an open-ended process.

3.2 | Flood damage compensation paradox

After a flood, solidarity is expected within the society. In many developed countries of the Global North, this is institutionalized with financial mechanisms for households to compensate for flood damages to speed up flood recovery processes. Such schemes include flood insurances—being purely private, as in Czechia or Poland (Slavíková et al., 2020);

with some kind of state back-up, as in Switzerland (Lamond & Penning Rowsell, 2014); and mandatory, as in France (Barraqué & Moatty, 2020)—and there are various versions of state flood recovery schemes (Suykens et al., 2016). However, experiences with existing schemes confirm that the broader the availability of postflood funding guaranteed by governments, the lesser is resilience pursued within the recovery phase. As Sandink et al. (2016) put it, “public relief programs have been criticized for shifting individual losses associated with disasters to the wider tax-paying population and limiting incentives for property-level mitigation....”

Recovery funding schemes do not always work for resilient flood recovery. They may contain incentives to reduce vulnerabilities for future flood damages at the individual level by demanding standard retrofitting of buildings after floods (Priest, Penning-Rowsell, & Suykens, 2016). Incentives can be a threat to the exclusion of a property from coverage, unaffordable high premiums as in Canada (Sandink et al., 2016), or restrictions for newly built areas as in Belgium (Suykens et al., 2016). Sometimes, additional compensation might be offered for specific property-level protection measures (see Drennan et al., 2016 or Sandink et al., 2016). However, recent evidence shows that incentives described above, aimed at building the linkage between resilience and recovery, are not widely applied in existing flood recovery funding schemes (Priest et al., 2016; Slavíková et al., 2020). Moreover, publicly subsidized state flood recovery funding—particularly, if implemented parallelly with other mechanisms—tends to crowd out the market or community incentives, such as private insurance (Raschky, Schwarze, Schwindt, & Zahn, 2013). The crowding-out effect that explains how increased central government activity negatively affects the flood risk mitigation of other actors was investigated, for example, in Austria (Raschky et al., 2013), Czechia (Slavíková, 2018), the United States (Boustan, Kahn, & Rhode, 2012), and India (Sarkhel, 2015). It also leads to incentivizing moral hazard effects (Davies, 2016; Hartmann, 2011; Slavíková, 2018). Moreover, as highlighted in the example of the U.S. National Flood Insurance Program (NFIP), recovery schemes that allow repeated rebuilding of properties in flooded areas reinforce future flood risks and keep more people locked in floodplains (Eastman, 2015).

It seems that governments that have the power to implement or re-design state flood recovery schemes tend to prioritize speed over resilience (see also other sections). However, the perceived responsibility-sharing for household flood damages is contextually determined—it varies from significant governmental contribution (such as in postsocialistic European countries; Slavíková et al., 2020) to almost no governmental engagement (such as in England and Wales; Penning-Rowsell, 2015). There is hardly any common practice regarding the extent to which people shall financially contribute to their flood damage. Therefore, the key paradox is that compensation schemes are needed for a quick recovery—this is also part of resilience—but they need to be designed in such a way that while offering a quick unbureaucratic help, they do not set the wrong incentives, which may lead to moral hazards. This is apparent for example, in case of government flood relief funding that may be distributed as a lump sum per affected household as in Czechia or as a percentage derived from actual damage as in Slovakia (Slavíková et al., 2020). The former procedure is faster (no calculation of damages is needed), but the latter adjusts the compensation to actual needs. On top of that, the question of just compensations can be raised that brings us to the social equity paradox.

3.3 | Social equity paradox

The social dilemma of flood recovery financing revolves around the question that for whom should the flood recovery schemes be designed. Social equity in flood recovery ideally ensures that each person has full and equal access to recovery schemes (Emrich, Tate, Larson, & Zhou, 2020). However, the reality is quite different (Koks, Jongman, Husby, & Botzen, 2015). The question regarding who is affected (socially advantaged, disadvantaged, or marginalized households) has different implications for the question regarding the consequences of a flood event for these groups. Developed countries do not support the view that poorer households are more likely to be exposed to flood hazards than others. The literature shows inconsistent findings, and some studies have even demonstrated that middle/high-income households are more likely to be exposed to flood hazards than others (Collins, Grineski, & Chakraborty, 2018; Montgomery & Chakraborty, 2015; Walker & Burningham, 2011).

The level of economic losses is based on the socioeconomic status of each household. Socially advantaged households usually have higher physical damage because of the size of buildings (socially advantaged people have larger house sizes, which cause higher losses on building structure) and higher monetary losses on household content. Thus, their economic losses are higher in comparison to that of socially disadvantaged householders (Emrich et al., 2020; Penning-Rowsell et al., 2005). Nevertheless, socially disadvantaged groups usually suffer far more from flood events than socially advantaged ones (Fothergill & Peek, 2004; Peacock, van Zandt, Zhang, & Highfield, 2014). Socially vulnerable groups are more likely to be at risk from health impacts after a flood event (Deeming, Whittle, & Medd, 2011;

Medd et al., 2015), usually show less bridging social capital (Munoz & Tate, 2016), have a greater risk of losing job afterwards (Elliott & Pais, 2006), suffer from huge physical damages because of the low building quality (Emrich et al., 2020), and face larger delays in receiving disaster-aid support (Munoz & Tate, 2016). Consequently, losses from flood events do not present an equal opportunity for socially advantaged and disadvantaged households.

Furthermore, socially disadvantaged householders can be discriminated by disaster recovery funding agencies. Usually, these groups have no insurance claims, which is problematic in countries like the United Kingdom, and are without any public compensation policy (Booth & Tranter, 2018; Penning-Rowsell, 2015; Thaler & Priest, 2014). Consequently, these households do not receive any compensation from insurance companies or public administration, which would cause a stronger social stratification within communities (Booth & Tranter, 2018). On the contrary, many countries have government compensation schemes, such as disaster aid payments in Austria and Germany or disaster recovery funds (Individual Assistance (IA), the National Flood Insurance Program (NFIP), Small Business Administration (SBA) disaster loans, and the Community Development Block Grant-Disaster Recovery (CDBG-DR)) in the United States. Nevertheless, the question is if they can ensure social equity in disaster recovery (Emrich et al., 2020; Thaler & Fuchs, 2020). These flood recovery schemes have some features of social equity; however, most programs focus on physical damage, which shows clear disadvantages for socially vulnerable households (Emrich et al., 2020; Thaler, Boteler, Dworak, Holen, & Lago, 2014). Most flood recovery schemes tend to encourage specific communities for specific technical definitions (like cost-benefit assessments), for example, focus on physical damages, instead of a balance between equitable outcomes and improvements and between physical damages and social vulnerability.

The social equity paradox unfolds in the target groups of the flood recovery schemes: the most vulnerable and weak groups are in the biggest need for flood recovery financing; however, the schemes are designed in such a way that the group which profits most from the schemes are not those who are most in need.

4 | CONCLUSION

The academic debate on financial schemes for resilient flood recovery of households is still in its infancy. There are studies on aspects of recovery and resilience that specifically focus on recovery financing, but not comprehensive debate on the topic of how recovery schemes can contribute to increase resilience. This article indicates directions for such a debate by pointing at the three paradoxes. These paradoxes are significant—yet unsolved—challenges of resilient flood recovery. Although each of the three paradoxes poses specific problems and might have distinct solutions, they need to be addressed to achieve resilient flood recovery.

An open question is whether compensation schemes and other instruments activated during the recovery period can, simultaneously:

- provide quick flood relief and simultaneously increase resilience,
- provide incentives for adaptive measures without entrenching flood risk and pushing moral hazards, and
- target vulnerable groups while also being equitable.

Thus far, no flood recovery instruments have managed to address these issues completely, but as indicated in the article some existing schemes hint at possible solutions or entail viable elements. It is thus imperative, when pursuing resilience in FRM, to embrace financial flood recovery schemes as an important element of resilient flood recovery (BOX 1).

BOX 1 HOMEOWNERS POSSIBILITIES TO IMPROVE FLOOD RESILIENCE

Private properties are highly vulnerable to flood. To achieve flood-resilient communities, residential houses can, and increasingly are expected, to adapt their buildings to reduce future risks. Many different measures are available for this purpose (property-level flood risk adaptation, PLFRA) (Attems et al., 2020). Some of these PLFRA are relatively low-cost solutions. PLFRA such as mobile barriers and backwater valves or avoiding vulnerable uses in basements can make residential buildings more flood resilient. However, homeowners insufficiently implement such measures. It is a challenge to motivate homeowners to take such steps, especially after flood events within recovery.

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CONFLICT OF INTEREST

The authors have declared no conflicts of interest for this article.

AUTHOR CONTRIBUTIONS

Lenka Slavikova: Conceptualization; funding acquisition; investigation; writing-original draft. **Thomas Hartmann:** Formal analysis; investigation; writing-review and editing. **Thomas Thaler:** Participated in writing of the paper; data curation; resources; validation.

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