



# Patience, persistence and pre-signals: Policy dynamics of planned relocation in Austria



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## ABSTRACT

Within the wide array of adaptive responses to flood hazards, planned relocation of residents at risk is usually only taken into account if other responses are ineffective or unavailable. Residents targeted by planned relocation are confronted with radical changes in their livelihood; therefore, relocation is highly contested within public risk discourse. The present paper assesses dynamic processes in the design and implementation of voluntary planned relocation in the Austrian Danube catchment over five decades. Using the Multiple Streams Approach, the emergence of policy windows is mapped to developments in the problem, political, policy and population streams. A mixed-methods design combines semi-structured interviews of 88 affected households and 21 decision-makers with archival research. Repeated flood events underscored that standard protection did not suffice for all riverside communities. In consequence, national authorities acted as policy entrepreneurs to advocate planned relocation and direct the discourse; by contrast, local stakeholders and residents played a mostly passive role. The relocation policy developed from ad-hoc informal arrangements towards a formalised procedure. Relocation governance evolved as incremental change over a long time span instead of immediate, radical disruption. Policy acceptance by residents depended crucially on social learning and on coincidence with personal circumstances and biographical stages. Policy windows opened for several years, when pre-signals from ongoing public debate accumulated and the different timescales in the decision-making of public administrators, elected representatives and residents aligned. Key factors were long-term perspective, flexibility, engagement and social capacity at a local level to deal with and manage planned relocation.

## 1. Introduction

The imposing challenge of climate change calls for a fundamental reorientation of current policy strategies (IPCC, 2012). Policy makers, stakeholders and citizens are tasked with developing adequate responses to an increase in extreme weather events, possibly coupled with sea level rise, coastal erosion and land subsidence. Consequently, political discourse centres on making our societies more resilient and on understanding the policy dynamics of the current system for enabling adaptation to future risks (Adger et al., 2013; Brundiers and Eakin, 2018; Patterson et al., 2018).

In practice, however, many policy makers struggle with implementing enduring change (Penning-Rowsell et al., 2017; Nordbeck et al., 2019). Flood risk governance evolves over time, often in a painstakingly slow and gradual manner, and is critically dependent on policy windows for taking the next incremental step. However, slow

progress in policy deployment may also reflect how stakeholders revise their views and capabilities in the light of mutual learning outcomes and continuously adapt policies to previous experiences and future needs. As rapid action is crucial in preparing for impending climate impacts, an in-depth understanding of the dynamics in evolutionary flood risk management may inform the design of accelerated policy strategies (Gazley and Kissman, 2015; Termeer et al., 2017; Garschagen et al., 2018).

Austria's policy of planned relocations in the Upper Danube catchment offers a unique example of dynamic flood risk governance, as, over the course of five decades since the 1970s, early ad-hoc solutions have led to learning and reflection that have manifested as a standardised set of rules and procedures for managing retreat from areas at risk of flooding. The planned relocation of households is often seen as the *ultima ratio* in flood and coastal risk management. Although highly effective by permanently reducing exposure, planned relocation is

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typically neglected as an adaptation option (Perry and Lindell, 1997; Orlove, 2005; Bukvic, 2015b, 2015a) because policy makers anticipate low acceptance and public outcry among residents, who would face a radical change in their livelihoods (López Carr and Marter Kenyon, 2015).

The implementation of planned relocation in Austria seems well suited to illustrate how iterative deployment of this policy plays out in real-world practice. Using the Multiple Streams Approach (MSA; Kingdon, 1984), we describe how Austrian relocation policy evolved as a trajectory over time. The MSA is increasingly applied to understanding dynamics in flood risk management (Bubeck et al., 2017; Penning-Rowsell et al., 2017). The MSA posits that convergence or divergence between problem, policy and political streams facilitates or limits adoption of a particular policy. Thus, the MSA provides a useful framework for structuring and interrelating the parallel processes of increasing flood risk, adaption of relocation policy instruments and shifts in governance arrangements. Our perspective on long-term dynamics emphasises that policy windows may endure over several years, as the conditions within each stream that mark the opening or closing of a policy window gradually emerge, coincide and fade. By means of a dedicated population stream, we expand the MSA framework by the policy implementation stage: in contrast to compulsory policies, which (if fully enforced) apply uniformly to all citizens, the outcome of a voluntary relocation program depends on the acceptance and sense-making by those addressed by the policy.

This qualitative study provides an overarching narrative of five decades of policy deployment in Austrian flood risk governance at the example of the non-technical aspects in implementing relocation. Austrian flood risk management along the Danube included three main waves: wave 1 started in the 1970s and concerned the Machland South region; wave 2 started in the 1990s focussing on Machland North and South; and finally wave 3 started in 2015 in the Eferding Basin Fig. 1. The paper shows how, when, under which circumstances, how long and how successful policy windows were organised and leveraged for implementing planned relocation in flood risk management.

The remainder of the paper is organised as follows: next, we introduce the policy measure of planned relocation and operationalise it within the MSA framework. After outlining our mixed-methods approach comprising archival research and interviews with key experts

and residents, we demonstrate that Austrian flood risk management has met various policy windows to implement planned relocation. We argue that these windows resulted in low acceptance if implementation focused on technical aspects and neglected the different pace and time-scales in the decision-making of public administrators, elected representatives and residents. Although our conclusions solely rest on the example of regions at risk of fluvial flooding in Austria as a western industrialised country, they may contribute to relocation guidelines published by the World Bank (Cernea, 1997; Correa et al., 2011) and the UNHCR (2014), particularly in underlining the long duration of evolutionary governance processes.

### 1.1. Planned relocation as policy measure

Planned relocation is understood here as a directed measure that is initiated, overseen and financed by national authority, in which a community of private households moves from a risk to a non-risk location where they resettle permanently (UNHCR, 2014; Kloos and Baumert, 2015). Our example of the Upper Danube catchment is a voluntary, anticipatory compensation scheme; therefore, the results should be extrapolated with caution to related contexts of climate-induced displacement, temporary-turned-permanent evacuation and compulsory relocation (de Sherbinin et al., 2011; Nalau and Handmer, 2018), or population migration to habitats less threatened by natural hazards (Black et al., 2011; Mallick and Vogt, 2014). In past decades, various countries across the world have conducted planned relocations to reduce exposure and vulnerability (Petz, 2015; Usamah and Haynes, 2012).

Relocation can be a relevant strategy in disaster risk management, when settlement areas cannot be secured by other protection or prevention measures because of technical reasons or disproportional costs, such as coastal erosion, sea level rise, volcanic hazard, or, as in our Austrian case, frequent flood events at the waterfronts of major rivers (Bukvic and Owen, 2017; Nalau and Handmer, 2018). Planned relocation is commonly employed to correct past land-use decisions and to react to hazard exposure that was unknown in the past (Schindelegger, 2019). Nevertheless, planned relocation interferes with landowner rights, which implies expensive and tedious negotiations or lawsuits (Hartmann, 2011). Therefore, the permanent movement of

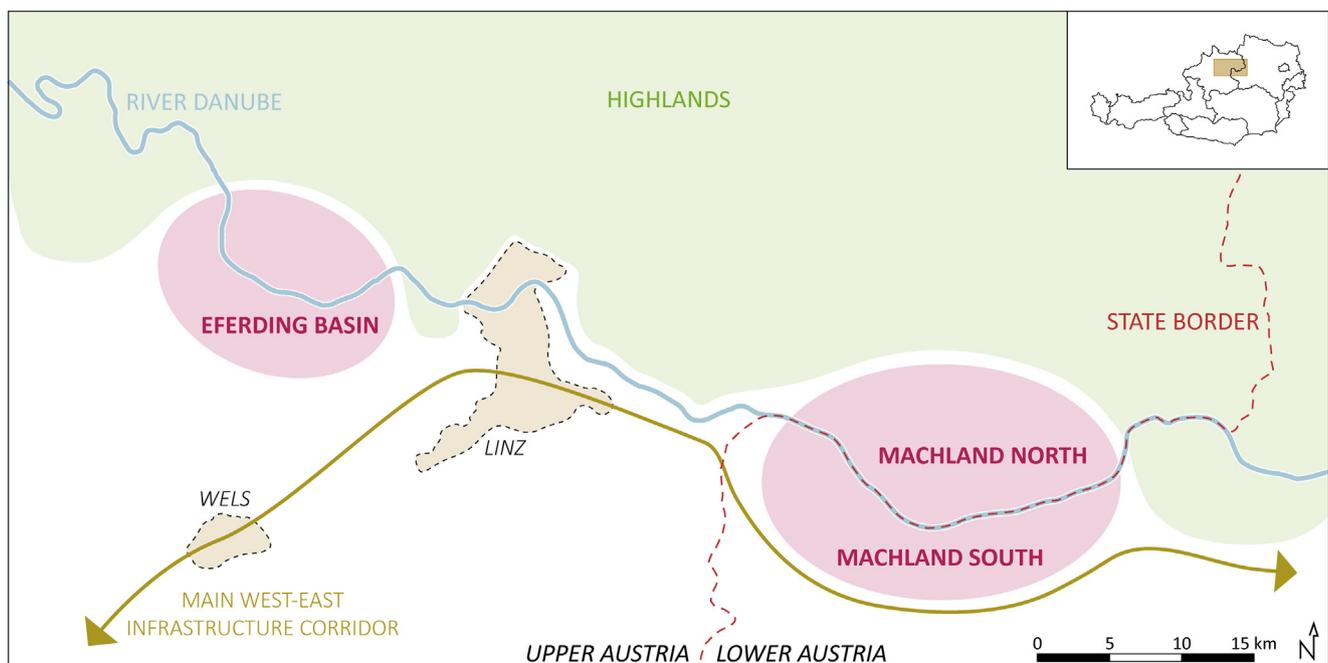


Fig. 1. Location of the case study areas.

residents is usually the least-preferred and last option in flood and coastal risk management (Tacoli, 2009; Barnett and Webber, 2010).

Planned relocation is highly effective in reducing potential losses caused by expected future events (McLeman and Smit, 2006; Bukvic and Owen, 2017). However, planned relocation comes with severe long-term consequences for the people living in a relocation area (Sipe and Vella, 2014; Seebauer and Winkler, 2020a). Relocated residents struggle with multiple impacts, such as: overcoming emotional attachment to the previous residence; coping with financial burdens and resuming gainful employment; recreating disrupted community structures (Jha et al., 2010; Mallick and Vogt, 2014; Hino et al., 2017; Binder et al., 2019). These intangible impacts often exceed the economic costs and benefits and carry pivotal weight in governmental and private decisions. Older and less mobile people tend to choose against relocating even though they are more vulnerable as well as restricted in their coping resources during disaster events (Sanders et al., 2003; Thaler, 2017). Farmers and freshwater fishermen depend on access to and exploitation rights for land- and waterscapes (Bukvic, 2015a, 2015b). Residents differ in their capabilities to participate in political discourse, to manage and finance planned relocation, and to re-establish their livelihoods and social networks (Perry and Lindell, 1997; Seebauer and Winkler, 2020b). This variability in social vulnerability challenges relocation managers to provide differentiated solutions within the concerned communities (Cutter et al., 2003; Lindell et al., 2006). While the reduction in exposure by moving out of the area at risk takes place immediately, the policy discourse leading to the planned relocation and the ensuing adverse consequences typically unfold in the long term; thus, an analytical framework for this policy measure needs to accommodate a temporal perspective.

1.2. Applying the Multiple streams approach to planned relocation

In his influential work on the process of political agenda setting, John Kingdon's (1984) Multiple Streams Approach (MSA) distinguishes between the problem, policy and political streams (Table 1). These three streams run in parallel, interact and flow in a co-evolutionary and non-linear manner (Gual and Norgaard, 2010; Dolan, 2019; Vo et al., 2019). Consequently, these different streams meet or diverge in varying arrangements and underlie continuous change (Capano, 2009).

When the three streams come together for a certain period of time, a policy window appears. Such a window of opportunity enables policy

change and may be opened by external triggers (natural disasters, financial crises, etc.) or regular events (elections, budget deadlines etc.; Capano, 2009; Béland and Howlett, 2016). Policy ideas, that is to say, potential solutions to problems, are continuously developed, modified and promoted by policy entrepreneurs. Policy entrepreneurs are individual actors within or outside the system who lobby for specific topics depending on their interests and social and cultural capital (Roberts and King, 1991; Mintrom and Norman, 2009; Table 1). Policy entrepreneurs do not just promote their favoured problems or ideas, but also couple solutions to problems and both problems and solutions to politics. Whenever a policy window appears, policy entrepreneurs step up to direct the attention of policy makers towards selected ideas in order to align the political agenda with their own interests (Cairney and Jones, 2016).

The MSA concepts of streams and policy windows already appear prominently in the flood risk management and relocation literature (Penning-Rowsell et al., 2017). Streams as dynamic processes appear as the year-long completion of planned relocations, spanning the passing of legal regulations, cultivation of the abandoned location and reconstruction of infrastructure and buildings at the new location (Correa et al., 2011; Mortreux et al., 2018). The agendas of specific stakeholders evolve and re-align during this process (Perry and Lindell, 1997; Binder et al., 2019). Streams as competing interests present themselves in the observation that the main barriers to relocation schemes are often a lack of political will and governance as well as uncertainty about interim and final outcomes (Doherty and Clayton, 2011; Bukvic, 2015b; Hino et al., 2017; Thaler, 2017). Flood events may accelerate transformational processes, disrupt stagnating or circular policy discourses (Birkmann et al., 2010; Rose et al., 2017; Friedman et al., 2019) or even facilitate the implementation of new, in some cases radical, local adaptation strategies (Brundiers and Eakin, 2018), such as deploying a relocation scheme (Kuhlicke, 2008; Iuchi, 2015; Braamskamp and Penning-Rowsell, 2018).

However, Kingdon's original conceptualisation of the MSA is restricted to explaining the precursory processes of agenda setting and does not account for the subsequent implementation of a new policy agenda. Therefore, we extend the MSA by a fourth stream: the population stream (see Table 1) to capture that the relocation policy does not deploy uniformly to full effectiveness among all citizens (as does Kingdon's example of the US health welfare program Medicare), but that the policy's impact depends on the number of citizens who accept a

**Table 1**  
Definition of elements in the multiple streams approach.

Element	Definition in Kingdon (1984)	Definition in the present study
Problem stream	Mirrors how public perceptions might see/define a problem, how attention shifts to a situation requiring a solution, and how public administration needs to solve it through feedback on existing political programs	How past flood events encourage public administration to act to reduce future flood risk; e.g., sequence of previous flood events, use of the river basin for hydropower plants and agriculture, exposure from settlement and building density, available options for (non-)structural flood protection
Policy stream	Mirrors how debates and proposals (not necessarily consensus-based) are crystallized at expert and professional level in how they define the problem and provide solutions; with the aim of binding guidelines or manifest implementation practice. Consensus building based on persuasion.	How the compensation program was designed and revised over time; e.g., public budgeting for the compensation payments, criteria for buildings to be eligible for compensation, stringency in enforcing relocations, flexibility in terms of implementation
Political stream	Mirrors a body-politic perspective, such as public mood, pressure groups, election results, changes of administration; presence of the problem in the minds of the populace. Consensus building based on bargaining.	How the discourse among policy actors developed; e.g., power relations, conflicts of interest and negotiation between actors, learning and build-up of competences, influence and inclusion of citizens in the decision-making process
Population stream	Not included.	How residents in the relocation zone made sense of and accepted the compensation program; e.g., traditional flood management expertise, role model and social network effects, personal circumstances, coping with planned relocation
Policy window	Opens if all streams culminate and allow for decisive change, coupling issues and developments in all streams	How timescales and power relationships between actors converged; e.g. setting relocation on the flood policy agenda, flood events catalyzing previous discussions, implementing relocation programs
Policy entrepreneur	Actors who promote specific topics by raising awareness, pressing ideas, bringing solutions to the table and building coalitions.	Stakeholders who brokered the compensation program across governance levels; e.g. advocating in working groups and councils, investing time and resources for designing formal procedures, garnering support from key actors

voluntary compensation scheme (Imura and Shaw, 2009; de Vries and Fraser, 2012). Planned relocation confronts residents with profound changes in their lives, regardless of whether they stay or leave (Perry and Lindell, 1997). Relocation schemes may fail because residents simply refuse to move (Imura and Shaw, 2009), while collaborating with local citizens in planning and organisation may facilitate the relocation process (Usamah and Haynes, 2012). In addition, the more actors have a say in controversial trade-offs, the more likely it is that few powerful actors benefit from asymmetric power relations and dominate the outcome at the expense of those less entitled, less eloquent or less politically connected (Seebauer et al., 2019). Asymmetric power relationships are an integral element of flood risk management politics, especially if citizens have the power to undermine public authorities (Matthews and Potts, 2018). Asymmetric power relationships may impede policy implementation; they can be deeply rooted in cultural perceptions, social norms, legislation and resource management (Biesbroek et al., 2013; Eisenack et al., 2014). Therefore, the assessment of power relationships is crucial to understand the evolution and successful use of policy windows in flood risk management. The findings in the present paper underline the critical role the affected population plays in the deployment and uptake of voluntary compensation schemes.

## 2. Method

This study used a mixed-methods approach to reconstruct how past flood and political events, activities, decisions and planning and implementation strategies unfolded within the four streams. Triangulation by (1) interviews with decision-makers (capturing the problem, policy and political stream), (2) archival research (policy stream), and (3) interviews with residents (population stream) validated and contextualised method-specific findings, identified informal aspects not covered by written sources and developed consistent narratives within each stream. The issues explored within each method served as initial coding scheme that was gradually extended and cross-referenced as evidence accumulated from different sources.

Between 2012 and 2018, semi-structured qualitative interviews were conducted with 21 decision-makers in national, regional and local authorities (Appendix A). Initially, key informants at the national level were selected based on personal recommendations, previous scientific studies, newspaper articles and internet websites. Using the snowball technique, the circle of informants was expanded to the regional and local level; throughout, direct involvement in the implementation of planned relocation projects was the key recruitment criterion. The interviews explored views on the (1) relocation process (planning process, such as legal framework, level/type of compensation, decision-making and implementation process), (2) barriers and drivers in the implementation process, (3) governance arrangements and (4) policy discourse in the study region. Selected interviewees were approached multiple times for follow-up clarification of details or contradictory statements and to capture ongoing governance rearrangements in an iterative manner. Interview audio recordings were transcribed, openly coded referring to the grounded theory approach (Strauss and Corbin, 1998) and analysed to reconstruct the policy and political stream.

In parallel to the interviews with decision-makers, archival research compiled policy documents (e.g. cabinet papers, press releases, legal texts), historical maps, photos, media reports in digital archives, staff reports from national and regional authorities (e.g. water engineering and agricultural departments) and notification letters to residents (Appendix B). This archive of source materials was used to examine the policy stream as it manifested in formal rules and frameworks of the relocation schemes.

Between 2015 and 2018, semi-structured qualitative interviews were conducted with former and current residents in the respective relocation zones. Regarding relocation wave 1, contact data for households who relocated as early as in the 1970s were obtained from

local actors such as a former fire chief, and by cross-referencing entries on a memorial stone with phonebook data; four households could be persuaded to take part in an interview. Regarding wave 2, five households were recruited by means of referral from interviewed decision-makers; complementary information was derived from the interview studies by Seher and Berger (2008) and Swoboda (2016). Regarding wave 3, 79 households were recruited by canvassing people in all residential buildings in the relocation zone; half of these households were revisited at least once until 2018. The interviews explored flood risk appraisal and flood experiences, political participation, social networks, decision factors for and against relocating, and recovery of livelihoods; two companion papers analyse decision factors and recovery in detail (Seebauer and Winkler, 2020a, 2020b). Sample socio-demographics are given in Appendix C. As above, interview audio recordings were transcribed and analysed based on open-coded process to establish the population stream.

All three triangulation methods were leveraged for cross-checking within and between streams, particularly when reconstructing events and considerations that took place years previously and might be coloured by hindsight or memory bias. Still, it should be kept in mind that depth and reliability of results are greater for the more recent relocation waves. Due to the purposive sampling approach designed to capture the full scope of decision dynamics, we refrain from reporting frequency counts of responses as our samples may not be representative for the actual distribution among all decision-makers and residents in all waves. We further refrain from verbatim interview quotes so to avoid giving disproportionate weight to selected interviewees.

## 3. Results

### 3.1. Problem stream

The Danube region plays an important economic role in Austria. The metropolitan area of Linz accounted for more than 800,000 inhabitants, €35 billion GDP and more than 400,000 jobs in 2016 (Eurostat, 2019). The region holds a high share of large businesses, mainly in the industrial sector, as well as small and medium businesses very active in software and information and communications technology (ICT), as well as high productivity within the agricultural sector (Tödting et al., 2013; Isaksen and Trippel, 2017). The Danube river shoreline and basins have experienced several major flood events in past decades. In particular, exceptional flood discharges were observed in 1954, 2002 and 2013 in the Upper Danube, which profoundly affected the regions of Upper and Lower Austria (Habersack and Moser 2003; Blöschl et al., 2013, 2015). Consequently, these events caused a great deal of damage to residential buildings, the regional and local economy, and the infrastructure. Aside from flood events in the years 1965, 1966 or 1991, the Danube area has manifested relatively flood-poor years over the past 60 years (Blöschl et al., 2013). Upper and Lower Austria have undergone various socio-economic and hydro-meteorological changes in the past. These changes had a strong effect on the riverbed as well as flood characteristics. Key changes have been: (1) influence on the riverbed, such as removal of potential flood storage capacities along the Danube, for example, by the construction of hydropower plants; (2) increase of exposed buildings and potential damage caused by settlement pressure to build new and more residential and non-residential buildings in floodplains; and (3) climate (atmospheric) changes such as change of rainfall characteristics (Di Baldassarre et al., 2013; Blöschl et al., 2013; Paprotny et al., 2018). Initiated by national and regional authorities as a response to the past flood events, the river shows a long tradition of high-level standard protection to reduce the risk of future flood hazard events. Nevertheless, the proximity of various communities to the Danube river as well as hydrological and geomorphological circumstances do not allow the construction of flood alleviation schemes everywhere to provide protection from events with an up to 100-year return period, the usual level of protection in Austrian flood

risk management (Löschner et al., 2017; Nordbeck et al., 2019).

### 3.2. Policy stream

Implemented planned relocation projects along the Danube river vary in scope from stand-alone buildings to projects comprising entire villages (Schindelegger, 2019). In spite of the differing scopes, the legal framework, as well as responsibilities, are alike. The policy stream should outline these pivotal conditions for relocation processes and their evolution over time.

Providing a safe living environment is a public responsibility in Austria but a general obligation to provide comprehensive flood alleviation schemes does not exist. In fact, those at risk are responsible for taking measures. Because individual action would lack effectivity, sophisticated public flood risk management – including planned relocation – has been established (Rauter et al., 2019). The actual planning of flood risk management strategies was transferred by legal decree to the national and regional authorities (ÜV-HWS, 2006). Local authorities need to actively apply for flood alleviation schemes (BMVIT, 2010). Besides the distribution of responsibilities, financing flood alleviation schemes is also based on shared contributions among national, regional and local authorities. These non-dynamic elements of the policy stream remained widely constant over all three relocation waves.

Despite the legal framework for flood risk management being in place, planned relocation was not recognised as an actual prevention measure in the 1970s when first conducted at the Danube river. In the first relocation wave in Machland South only farmers were affected, and therefore a compensation scheme using funds reserved for agricultural subsidies was established due to the efforts of local politicians. The individual compensation payments were based on the time value of the concerned buildings and were paid out initially as a one-off advance payment, but later, as in some cases the demolition of the farmhouses was postponed indefinitely, paid out by instalments to ensure the actual demolition. The first relocation program had no time restriction, with the result that all identified households (approximately 40) were relocated within a decade (Interviewees 1, 5, 19; interview numbers are referenced in appendix A; they show the position within the level of governance).

The flood event of 1991 led to a shift in the flood risk management policy in the Danube region that aimed to establish a uniform procedure for planned relocation drawing on learnings from the previous program. The connection to agricultural funds was abolished, and compensation payments were acknowledged as an investment for flood alleviation schemes. As a consequence, relocation needed to be integrated into protection projects and follow the general guidelines and regulations, which meant a limited provision of funds. The compensation scheme was based on shared contributions: 50 per cent of costs were taken over by the national government, 30 per cent by the regional authority and the rest by homeowners as individual contributions. The scheme compensated for 80 per cent of the time value of buildings as well as 80 per cent of estimated demolition costs. Plots remained with their owners who additionally had to declare a waiver concerning any further construction activity. The valuation of buildings had to be conducted by an expert and needed to be checked by the Ministry of Finance. As before, compensation payments were paid out by instalments to ensure actual demolition. Additionally, a time limit of five years for the demolition after receiving the first instalment was introduced. The new framework was embedded in a subsidy application to ensure that affected people accept the setup conditions voluntarily and have to fulfil them, preventing the loss of compensation payments. Lower Austria also officially adopted these relocation guidelines in the regional parliament (AdNÖReg, 1999; Interviewees 1, 2, 5–6, 8–9, 11, 19, 21).

In the third relocation wave after the 2013 flood event minor amendments were made to the framework developed after 1991 according to the specific needs in the Eferding Basin. In particular,

guidelines for the use and further development of remaining buildings were introduced complementary to a stronger focus on planning regulations. The amended framework introduced a new precondition for any compensation payment: the whole relocation area needed to be zoned for flood run-off with rigid restrictions for any development (Interviewees 7–10).

The development of the policy scheme demonstrates a process from ad-hoc informal arrangements towards a formalised procedure, including the consideration of past experiences by different authorities at national and regional level. Concerning the resettlement locations, the legal restrictions evolved between the three relocation waves: in the first relocation wave, residents selected their new locations based on traditional flood knowledge; in the second wave, relocated homeowners were able to rebuild their home outside hazard-prone area with a 1:100 return period; by contrast, in the third wave, new buildings had to be built outside the 1:300 hazard-prone area. Such provisions were possible due to the establishment of the relocations as a funding scheme in which applicants accept the given rules and not as a buyout program in which the public administration acquires property ownership (de Vries and Fraser, 2012).

### 3.3. Political stream

Since the 1970s, the regional authorities have organised planned relocations on a larger scale (Table 2). In the first wave, regional and local authorities mainly controlled the implementation of planned relocation, in contrast to the later relocation processes in the 1990s/2000s. The Federal Ministry for Transport, Innovation and Technology (BMVIT) played a crucial role in the second wave (between the 1990s and beginning of the 2000s). There were three main changes: first, the BMVIT heavily influenced the discourse and concept of planned relocation in the selected communities. Here, the BMVIT advocated the use of planned relocation in the Danube region. The Ministry took over the main responsibility for the design of the compensation scheme, in terms of which actors are involved, who pays, level of compensation, time framework from offer to demolition and so forth. Second, the BMVIT used the current legal framework to provide up to 50 per cent of the total expenses. Third, the BMVIT was heavily involved in determining criteria for which houses are eligible to a compensation offer. Nevertheless, the position of the BMVIT changed drastically (from an active to an inactive player) within the third (and so far last) relocation wave. Here, the regional authority took over the key responsibility for designing, organising and implementing the compensation scheme. Ever since, the role of the BMVIT has been limited to the provision of financial resources (still up to 50 per cent). In waves 2 and 3, the local authorities had only a minor opportunity to influence the relocation decisions (Interviewees 11–19). The main actions performed by local authorities were to convince citizens to accept the offer and to provide new building plots for the affected households (Interviewees 5–9). This low involvement was also caused by lack of social capacity at local level. The planned relocation process overwhelmed most of the mayors. Similar results can be found in the lack of residents' inclusion and participation in the process. Residents were allotted mainly a passive, non-participatory role. The regional authority provided information at several citizens' meetings, where the presentation included intermediate results in an expert language. Local knowledge, needs and interests were not included in the decision-making process (Interviewees 17–19). This missed opportunity created in the third wave, for example, a bottom-up citizen protest initiative, conflicts with residents and a protest note by mayors, which caused delays to the implementation and conflicts between regional and local authorities and stakeholders. Low interest and participation of local actors also went in hand with the different interests of each actor in the political discourse. In particular, national and regional authorities focused on clearing the floodplain, whereas the local authority tried to reduce the losses (e.g. financial, political, cultural) to the community caused by the

**Table 2**  
Relocation waves along the river Danube with affected households and degree of implementation (August 2019).

Relocation wave	Time period	Machland South	Machland North	Eferding Basin
1	1972–1991	app. 40 households; 100 per cent relocated		
2	1991–2013	> 100 households; nearly 100 per cent relocated	app. 250 households; nearly 100 per cent relocated	
3	2013 to current			app. 150 households; app. 40 per cent relocated, and only two-thirds showed interest by appraisal of property

compensation program. However, decisions and interests were not based on cost-benefit logic but on a political decision to remove the residential and non-residential properties (Interviewees 1–6).

The shift in the governance arrangement in each relocation wave also included an alteration of the relationship between different actors. The formalisation of the planned relocation process mainly started with the introduction of the BMVIT as a new actor in the planned relocation governance arrangement (Interview 1). This top-down policy provided, on the one hand, a standardised protocol for how to conduct the planned relocation, but on the other hand also included various restrictions, such as fixed time frameworks and less flexibility in terms of removing residential and non-residential buildings or providing individual solutions. Here, the BMVIT had the power in the final planning and implementation process. Furthermore, the water management departments of the regional authorities mainly led the planned relocation process. The lack of policy coordination between different departments caused the problematic situation that in none of the relocated areas strategic planning instruments for what should occur in the region during and after the process were applied.

The issue of timing, influencing public administration, stakeholders and citizens, played an important role. The planned relocation process in the first and second waves was mainly overshadowed by recent flood events. Consequently, residents were rather reluctant to accept the compensation offer in the early stage after the announcement of the relocation program. In the first two waves, the process of implementation showed the importance of pre-signals (mainly years of discussion) for acceptance and successful implementation in the region (Interviewees 11–13). In particular, the large 2002 relocation process in Upper Austria arose from a ten-year pre-discussion. A problematic example can be observed in the third relocation wave. The third relocation wave was initiated after the 2013 flood event without any previous local discussion (Interview 6). The regional authority had already intended the planned relocation process before the 2013 flood occurred but without consulting with local authorities and residents. Consequently, mayors and residents were overwhelmed and surprised by the relocation option after the 2013 flood, triggering mistrust in regional authorities.

### 3.4. Population stream

The relocation schemes met ingrained risk attitudes and property-level flood management expertise that the residential population had formed over a long time (Seebauer and Winkler, 2020b). Among families who had been living in the flood risk zone for generations, floods were perceived as regular events in the normal course of life in a riverside region. With each recurring flood experience, established coping strategies were reproduced and passed on from the older to the younger generation. These coping strategies comprised adapted buildings and facilities (e.g. massive stone walls on the ground floor, removable doors and windows, demountable machinery) as well as evacuation and recovery procedures (e.g. moving furniture and livestock to higher ground, cleaning mud and debris as the water level recedes). However, the high degree of traditional flood resilience applied only to wave 1, wave 2 and some of wave 3 residents. In wave 3, a substantial share of the population were newcomers from the nearby city of Linz who commanded minimal flood literacy and embraced wishful thinking, even denial, towards the inherent risks of the Danube floodplain. Consequently, these newcomers were most willing to accept the relocation offer.

Place attachment, a feeling of being rooted in the region as part of personal identity and biography (Lewicka, 2011; Brown et al., 2019), constituted a similar long-grown, ingrained mind-set that made residents reluctant to leave. Most households still struggled with overcoming the emotional bond to their former place of living after they had settled down in their new residence (Seebauer and Winkler, 2020a). Memories of the old place manifested themselves in many ways: some

wave 1 residents re-used roof beams and headstones from the old home; memorial signs mark the locations of old wave 1 buildings; new wave 2 settlements carry the old village names plus the prefix “new” (e.g. “Neu Hütting”); cultural artefacts such as roadside shrines were transferred to new locations.

The top-down implemented relocation programs thus had to come up against the residents’ deep-seated flood resilience and place attachment in order to be accepted (1) by arguing that traditional coping strategies would become insufficient for faster onset and higher inundation in future floods; (2) by financially supporting the re-establishment of a privately owned detached house built with one’s own hands in a safe location, because this way of living holds high status and personal value in Austrian rural regions; (3) by making staying in the risk area unattractive, for instance by withdrawing public services or stimulating peer pressure. This carrot-and-stick combination was implemented in all three relocation waves. However, besides the activities (1)–(3), two other dynamic processes turned out to be much more important for residents to actually accept the program: social learning and network effects, as well as coincidence with personal circumstances and biographical stages.

Social network effects played out across the entire process from first movers to the completed relocation of entire communities. Early relocators acted as role models for those contemplating relocation: in wave 1, residents refused to comply with the program until a single farmstead burnt down after a lightning strike and was re-erected outside the risk area; in wave 3, a handful of early relocators demonstrated to those who were undecided that establishing a new or even better livelihood was feasible within property market constraints. In all three waves, those who left tended to relocate close-by which allowed them to maintain access to their farmland in the risk area and to keep up contact with former neighbours, for instance by visiting the same church or the same sports club; however, these contacts dwindled and were gradually substituted by new neighbours as everyday schedules grew apart. In all relocation waves, very late relocators had encountered feelings of being left behind on their own, as their surroundings depopulated, social support diminished and communal infrastructure was dismantled; eventually, this encouraged them to abandon the risk area as well.

Although social network effects clearly took place, they were not acknowledged by the residents. Almost all households rejected the notion of having been influenced by their peers and instead underlined their egocentric decision making and their sense of autonomy and self-reliance within a neighbourhood where people mostly respect each other’s privacy. Social network effects were restricted to the communities involved in a specific relocation wave; in wave 3, social networks were also separated between communities located on the northern or southern riverbank of the Danube. Wave 3 residents once made a site visit to wave 2 households in order to learn about their planned relocation experience; however, this visit did not incur a change in the wave 3 residents’ mindsets, but rather served to justify the decisions they had already made.

Residents assessed the relocation program against the background of their current living situation and biographical stage. They were more willing to accept the compensation payment if they anticipated changing housing needs (e.g. children moving out of the parental home, divorce, limited mobility from old age) or if they had considered downscaling their farm business (e.g. children not taking over the farm, reducing or entirely giving up animal husbandry, leasing farmland to others). The importance of the relocation program coinciding with personal circumstances or biographical stages highlights the critical issue of the relocation timeframe. Keeping the relocation policy window open for a long time in wave 1 made it more likely that the offer coincided with a household situation that favoured relocation. The short availability period of just five years in wave 3 was intended to avoid bad investment in reconstructing flood-damaged buildings that would be torn down anyway, and was intended to rush residents into

accepting the offer while the 2013 flood was fresh on their minds. However, few households entered appropriate circumstances within this short timeframe, which may have contributed to the resulting low acceptance rate.

Most households concerned coped fairly well with deciding whether to leave or stay and with acting on this decision; they maintained their initial quality of life or recovered within a few years (Seebauer and Winkler, 2020a); however, two critical groups faced adverse impacts: (1) Households hesitating with the decision to stay or leave remained deadlocked in an uncertainty that kept them from actively shaping their life course. Small repairs to their building, job choices or similar medium-term decisions were postponed until an undefined future date. These households observed their friends and neighbours moving on with their lives but could not overcome their own procrastination. (2) Households confronted with personal crises in addition to the issue of impending flood risk and relocation, such as older or ill persons, those less affluent or single parents. Those households’ coping capacities were already overstretched by their personal crisis, which left them little space to tackle the relocation issue. This, again, highlights the critical role of personal circumstances in the uptake of planned relocation.

### 3.5. Policy windows and policy entrepreneurs

In the MSA, policy windows are considered essential conditions for the formulation and implementation of policies. Fig. 2 illustrates the problem, policy, political and population stream in relation to time (abscissa) and a qualitative assessment of their revealed dynamics (ordinate). The problem needs time to be processed for decision-making and shows a certain latency after flood events; policy formulation follows problem analysis; politics and population stream react to flood events with awareness peaks that ease with time. Note that Fig. 2 is not based on numerical data but instead depicts the interplay among the different streams.

The 2002 and 2013 floods enabled, but did not uniquely cause, the opening of policy windows. Policy windows emerged when developments of different speed within the respective streams converged; these different speeds were associated with the different timescales held by politicians and residents at the national, regional and local level. Public authorities pursued long-term plans as they are responsible for land use and infrastructure decisions with service lifetimes measured in decades. Austrian representatives and mayors are elected for six-year terms. Households took hardly longer than three years to appraise and reflect what the flood events meant for them personally, as disaster memories degraded rapidly and everyday life returned to normal as soon as reconstruction of damaged assets was completed. The start of the third relocation wave illustrates the convergence of timescales into a policy window: in internal scenario planning, the regional water authority had already drawn up plans for relocation as an alternative to build protection in the Eferding Basin for some years. Being strategically prepared when the 2013 flood event struck, the regional authority reacted quickly and took local mayors by surprise when announcing the relocation program in October 2013, just four months after the flood event. With the next elections set for September 2015, regional and local authorities had political leeway. Some residents were still involved with restoration work and therefore willing to rebuild their home in another location. The accelerated introduction of the relocation scheme fully leveraged this policy window; however, not carrying out participatory deliberation fuelled later resistance and mistrust of citizens towards the regional authority.

The various policy windows highlight power asymmetry between citizens and public authorities. The policy window after the 1991 flood passed unused as the population stream did not converge with the other stream and citizens were able to delay relocation and forced to re-start the planning the flood risk management scheme. Yet, in the current organisational-institutional setting of flood risk management, conflict-solving processes controlled by public authorities often fail to

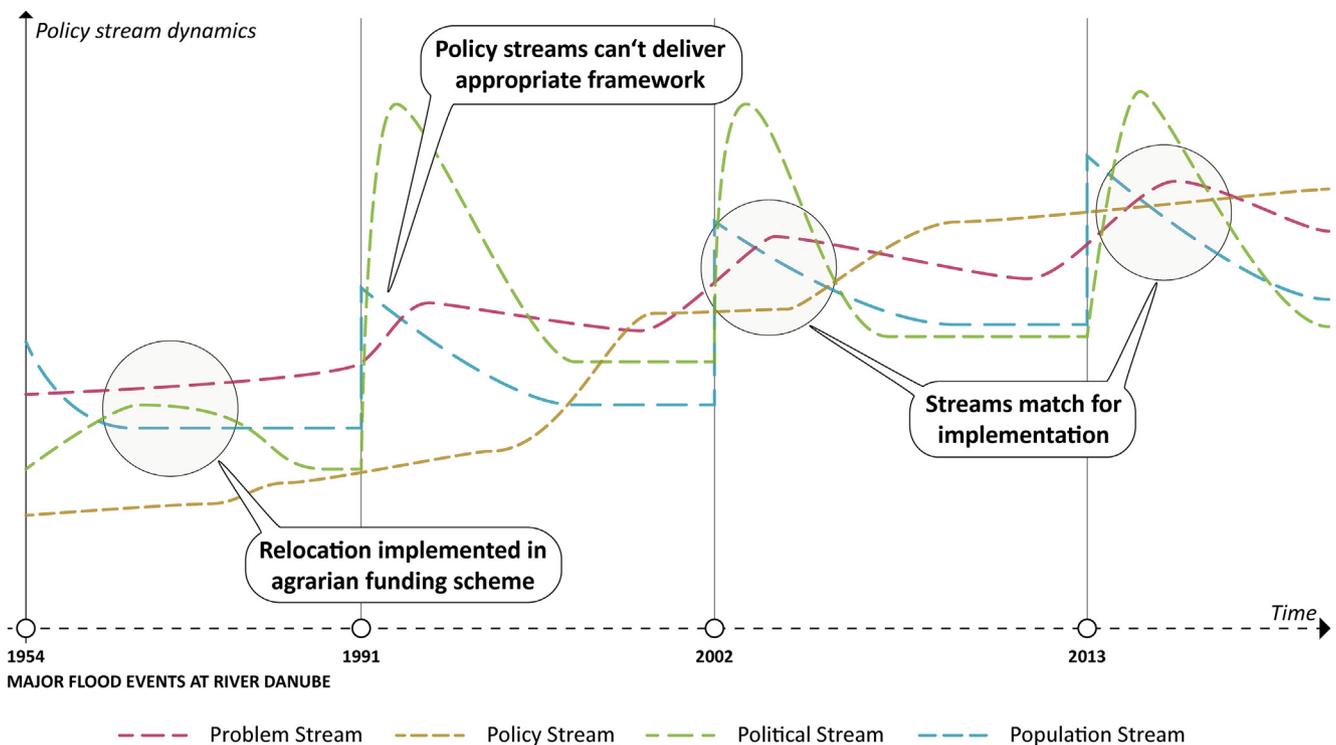


Fig. 2. Policy streams in planned relocation along the Danube river.

recognise, resolve or reconcile power asymmetries as root causes of conflicts.

Officials in the public authorities acted as policy entrepreneurs, as they stood out as pivotal actors during the development and deployment of planned relocation over the three relocation waves. In the first relocation wave, actors at the local level leveraged their political influence and familiarity with administrative bodies to procure relocation payments from non-flood budgets. The breakthrough achievement was to bring the relocation option to the negotiation table by arranging the first, albeit rudimentary, publicly funded compensation scheme. The second wave included a strong top-down interest of BMVIT to implement a flood protection scheme. This national player pushed the relocation process and implemented a standardised procedure and cost allocation that has lasted to this day. The third relocation wave was coordinated, rather than directed, by regional authorities. Naturally, other actors also stood out during the decades-long policy process: local mayors brokered the relocation program to their voters; a citizen protest group attempted (and ultimately failed) to raise public opposition. However, these actors did not succeed in assuming key entrepreneurial positions and did not shift the policy, political or population streams. The predominance of administrative personnel among the policy entrepreneurs is most striking: as soon as a defined ruleset had been established at the time of the second relocation wave, democratically elected representatives constrained themselves to minor readjustments and to communicating legal requirements and restrictions to their electorate. This indicates an underlying trade-off between formalisation and legitimacy: defined rules provided legal certainty and equal treatment over election periods; in return, these rules diminished politicians' room to manoeuvre and tempted them to shift responsibility to an anonymous and rigid administration.

#### 4. Discussion and conclusions

Planned relocation poses many challenges when introduced as a flood risk management policy. In our case study on five decades of implementing planned relocation in the Austrian Danube catchment,

flood risk governance evolved as incremental change over a long time span instead of immediate, radical disruption. Singular flood events did not open windows of opportunity for momentary, far-reaching policy change as the literature on flood risk governance suggests. Instead, repeated flood events gradually advanced planned relocation on the political agenda (Dolan, 2019; Minh Vo et al., 2019) and acted as accumulating pre-signals that accelerated and aligned the problem, policy, political, and population streams. Highlighting residents' appraisal and uptake of the relocation program with a dedicated population stream offers a theoretical expansion of the MSA, as the population stream illustrates how the success of a voluntary policy critically depends on the reactions of those targeted by the policy. In sum, the Austrian relocation policy was not realised as a one-off, top-down definitive implementation, but as a process of continuous adaptation, refinement and learning. Consequently, the results demonstrate that planned relocation can only be understood and implemented with a long-term perspective.

Time plays an important role in negotiating and realising relocation schemes. Policy makers, businesses and households in the target region need to engage in pre-discussions about planned relocation being a possible option. Cooldown periods after heated debate or political resignation may encourage stakeholders to listen (again) to the other side. Keeping the relocation program open over a long time period seems particularly important. Compensation funds in wave 1 were available without a time limit, whereas the compensation budget in wave 3 was reserved for just five years; therefore, wave 1 achieved 100 per cent success, whereas wave 3 has achieved only a 40 per cent acceptance rate of the relocation offer. The longer compensation funds are accessible, the higher the likelihood that the compensation offer will coincide with personal circumstances and biographical changes favourable to relocation; or that social networks effects take hold, and laggards follow the example of early movers; or that repeated flood events foster doubt as to the adequacy of existing flood alleviation schemes and traditional coping strategies.

In our Austrian case, flexibility in adapting to individual needs was abandoned in favour of conformity and legal certainty although these

two factors are crucial for successful implementation. In the later waves 2 and 3, affected residents could only accept or reject the compensation offer as it stood; only in the first relocation wave did the flexible rules and deadlines allow for a certain adaption to individual needs. Thus, following a flexible planned relocation policy would require long-term provision of financial and personal resources as negotiations with individual residents would take longer.

The lack of knowledge transfer between the national and regional authorities emerged as a key drawback in the implementation process. The experiences encountered in the Machland North and South were only partially passed on to the Eferding Basin actors, as some experienced actors retired. This lack of exchange is even more problematic as officials from national authority were policy entrepreneurs in the overall planned relocation process. Local actors had differing objectives depending on the local situations. Some mayors, for example, tried to avoid any loss of population or opposed the relocation completely because it meant restrictions to future development possibilities. Others were positive, recognising the potential of planned relocation for an efficient settlement structure. Concerning the process management, national and regional authorities neglected to provide adequate resources for the local level, with the consequence of insufficient sharing of responsibilities and unequal balance of power in the decision process, which can be described as a 'hollowing-out' effect (downscaling of tasks and duties, but without any further resources and responsibilities) (Thaler and Priest, 2014; Morrison et al., 2019). Consequently, the relocation policy was not designed to leverage horizontal policy integration with adaptation to long-term impacts from climate change, such as obligations towards dense settlement structures to limit additional public infrastructure, or requiring smaller floor areas and strict energy efficiency standards in new buildings. These obligations were not even considered in order to make the relocation offer as attractive as possible.

Insufficient citizen engagement impeded the entire relocation process. The population stream presumably would have unfolded more smoothly and more favourably to relocation if households had been included more actively and prominently in decision-making, if their concerns had been heard early on and if their knowledge had informed a co-design of the compensation scheme, especially in waves 2 and 3. Some democratically elected representatives stood up for the interests of their electorate, while others followed the lead of national policy entrepreneurs.

By analysing and evaluating the genealogy of planned relocation in Austrian flood risk management, we highlight when policy windows occurred and have been used for implementation. Policy windows may

trigger the introduction of new policy, such as planned relocation. However, the mere presence of a policy window does not directly lead to implementation or evolutionary processes at local level. We demonstrated that several conditions, such as acceptance by the population, are needed for leveraging policy windows. The population stream required time, flexibility within the implementation process as well as stronger engagement in the planning and decision-making process by institutional actors. On the whole, flood events were shown to be an important driver to adaptation and change of current flood risk management policies in Austria. Planned relocation strategies emerged rather coincidentally and were adapted to be legally sufficient while failing to achieve a comprehensive perspective taking other logics as depicted in the MSA into account. The lack of transparency was a stumbling block in the presentation, implementation and negotiation of planned relocation strategy for the communities. Affected citizens felt too resigned or helpless towards powerful incumbents to bring their experiences to the planning process. The lack of empathy from national and regional authorities has been a critical factor in the unsuccessful implementation (Maldonado et al., 2013; Bronen and Chapin, 2013; Bronen, 2015; Brown et al., 2019).

#### CRediT authorship contribution statement

**Thomas Thaler:** Conceptualization, Methodology, Formal analysis, Investigation, Writing - original draft. **Sebastian Seebauer:** Conceptualization, Methodology, Formal analysis, Investigation, Writing - original draft. **Arthur Schindelegger:** Conceptualization, Methodology, Formal analysis, Investigation, Writing - original draft.

#### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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#### Appendix A.: Complete list of interviews

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Interview 1: National Authority  
 Interview 2: National Authority  
 Interview 3: National Authority  
 Interview 4: National Authority  
 Interview 5: Regional Authority  
 Interview 6: Regional Authority  
 Interview 7: Regional Authority  
 Interview 8: Regional Authority  
 Interview 9: Regional Authority  
 Interview 10: Regional Authority  
 Interview 11: Local authority  
 Interview 12: Local authority  
 Interview 13: Local authority  
 Interview 14: Local authority  
 Interview 15: Local authority  
 Interview 16: Local authority  
 Interview 17: Local authority  
 Interview 18: Local authority  
 Interview 19: Local authority  
 Interview 20: Local authority  
 Interview 21: Local authority

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## Appendix B. Policy and legal documents

Level of governance	Type of documents
National	<ul style="list-style-type: none"> <li>● Federal Constitutional Law 1930</li> <li>● Fundamental State Law 1867</li> <li>● Administrative Procedure Act 1991</li> <li>● Forestry Law 1975</li> <li>● Water Act 1954</li> <li>● Law on Precautions for the Harmless Drainage of Alpine Waters 1884.</li> <li>● Security Police Act 1991</li> <li>● Federal Water Administration Transfer Decree (1969)</li> <li>● Federal Waterway Act 2004</li> <li>● Administrative Penal Code 1991</li> <li>● Hazard Zoning Decree 1976</li> <li>● Hazard Zoning Decree 2014</li> <li>● Guidelines for demarcating hazard zones for the National Water Engineering Administration – Ministry for Agriculture, Forestry, Environment and Water Management 2006</li> <li>● Technical guidelines for the Austrian Service of Torrent and Avalanche Control – Ministry for Agriculture, Forestry, Environment and Water Management 2006</li> <li>● Guidelines for hazard zoning – Ministry for Agriculture, Forestry, Environment and Water Management 2011</li> <li>● Technical guidelines for hazard zoning according to §42a Water Act – Ministry for Agriculture, Forestry, Environment and Water Management 2016</li> <li>● National Flood Risk Management Plan – Ministry for Agriculture, Forestry, Environment and Water Management 2016</li> <li>● Technical guideline for the Federal Waterway Administration – Ministry for Transport, Innovation and Technology 2010</li> <li>● General Guideline for granting federal funding 2004</li> <li>● 15a agreement among the federal state and the states of Lower Austria, Upper Austria and Vienna concerning flood protection along the river Danube 2007</li> <li>● National Strategy for Climate Change Adaptation 2017</li> <li>● #mission2030 – Austrian Climate and Energy Strategy</li> </ul>
Regional	<ul style="list-style-type: none"> <li>● Law on Funding Hydraulic Structures 1985</li> <li>● Spatial Planning Act 2014, Lower Austria</li> <li>● Lower Austria Spatial Planning Act 1968</li> <li>● Building Code 2014, Lower Austria</li> <li>● Building Code 1994, Upper Austria</li> <li>● Structural Engineering Code 2013, Upper Austria</li> <li>● Spatial Planning Act 1994, Upper Austria</li> <li>● Provincial Planning Program 2017, Upper Austria</li> <li>● Guidelines for the implementation of planned relocations within the framework for passive flood protection – State of Lower Austria</li> <li>● Information according to the public press conference 22.10.2013 and 10.02.2015 – State of Upper Austria</li> <li>● Information according to the public press conference of the state governor, 12.02.2015 – State of Upper Austria</li> <li>● Minutes of the advisory board concerning the flood protection in Eferding Basin 20.01.2014, 19.03.2014 and 17.07.2014 – State of Upper Austria</li> </ul>
Supreme court decisions	<ul style="list-style-type: none"> <li>● VfSlg 11.626/1988</li> <li>● VfSlg 13.282/1992</li> <li>● VfSlg 14.041/1995</li> <li>● VfSlg 14.155/1995</li> <li>● VfSlg 14.179/1995</li> <li>● VfSlg 15.625/1999</li> <li>● VfSlg 17.057/2003</li> <li>● VfSlg 19.819/2013</li> <li>● VfSlg 2.674/1954</li> <li>● VfSlg 8.280/1978</li> <li>● VfGH G 77/99</li> <li>● VfGH V 816/86</li> <li>● VwGH GZ 07/3271/80</li> <li>● VwGH GZ 91/10/0090</li> <li>● VwGH GZ 93/07/0096</li> </ul>

## Appendix C.: Sample characteristics in interview waves

Characteristics	Wave 1	Wave 2	Wave 3
Total number of households interviewed	4	5	79
Municipality (old residence)			
Ardagger	4	–	–
Alkoven	–	–	29
Goldwörth	–	–	18
Walding	–	–	32
Baumgartenberg	–	1	–
Mitterkirchen	–	2	–
Saxen	–	2	–
Mean age (years) <sup>a</sup>			
20–40	0	0	19
41–60	1	5	40
61–89	3	0	20
Duration of residence <sup>b</sup>			
Long-term residents	4	5	60
Newcomers	0	0	19
Family status <sup>c</sup>			
Single/couple households, no children	0	0	29

Households with children	0	5	29
Multi-generation households	4	0	21
Highest educational degree <sup>d</sup>			
Compulsory education	2	2	8
Vocational education	2	3	37
Secondary school (with school leaving exam)	0	0	15
Higher education (university level)	0	0	19

Absolute numbers of households interviewed.

<sup>a</sup> Refers to owners of building/head of household. Children and grandparents not included.

<sup>b</sup> Long-term residents: The interviewee (or at least one person in the case of a couple) has grown up in the village or at least nearby, or the house has been family property for a long time. Newcomers: The interviewee (or both people in the case of a couple) did not grow up in the relocation area but moved there from another region.

<sup>c</sup> Households with children refer to children under 18 years. Multi-generation households refer to households who include, additionally to parent (s) and children under 18 years, grandparents and/or children over 18 years, who run their own household in the same building.

<sup>d</sup> Refers to owners of building/head of household. Children and grandparents not included.

## Appendix D. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.gloenvcha.2020.102122>.

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