



# Just retreat—how different countries deal with it: examples from Austria and England

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## Abstract

Flood risk management has developed a large inventory of potential actions to climate-related hazards. Within this wide array of measures, managed retreat of communities at risk is usually only taken into account if other strategies are ineffective or unavailable. Communities who are affected by managed retreat are confronted with radical changes in their livelihood. However, managed retreat is highly contested. The use of managed retreat includes not only the relocation of house owners but also has the challenge that it discriminates between landowners as some gain and others lose. Therefore, managed retreat raises issues of social justice. To mitigate the impact on land, compensation plays a crucial role in flood risk management. The level and kind of compensation varies between countries across the globe. In this paper, we compare two different policy compensation frameworks in two European countries: Austria and England. The comparative study shows how different compensation schemes affect social justice, both in terms of substantive distributions but also in terms of procedural justice.

**Keywords** Planned relocation · Fairness · Equity · Compensation · Policy analysis · Comparative studies

## Introduction

Recent climate-driven extreme hydro-meteorological events, such as hurricanes Harvey, Irma, or Maria in the USA and recent floods in Africa or Asia, clearly show that governments' and communities' engagement for addressing the challenges posed by climate-related risks is needed. Despite considerable efforts in installing technical solutions, such as levees and retention basins, there exist a high risk and potential losses caused by hydro-metrological hazards, such as floods (Ashley et al. 2014; Fuchs et al. 2017; Dottori et al. 2018; Paprotny et al. 2018; Thaler et al. 2020a). However, in many cases, engineering solutions are no longer able to ensure the demand of security (Thaler and Priest 2014; Thaler et al. 2016). Therefore, a key aim is to find new solutions to response to these challenges. In the past decades, different state examples have used managed retreat as an option to reduce exposure as well as vulnerability to future losses caused by flood risk events (Greenberg et al. 2007; Usamah and Haynes

2012; King et al. 2014; Tate et al. 2016; Siders et al. 2019). This paper defines managed retreat “as a directed measure that is initiated, overseen and financed by public authorities at different political level, in which a community of private households moves from a risk to a non-risk location where they resettle permanently” (Thaler et al. 2020b: 2). It includes the physical process of removing people to new living areas (Kloos and Baumert 2015; Hino et al. 2017; Barnett and McMichael 2018; Siders 2019a). Managed retreat is often based on short-term decisions, but usually might have long-term impacts to the local community (Riad and Norris 1996; Sipe and Vella 2014). Managed retreat can be a relevant option in flood risk management, when structural measures cannot be implemented or the costs are too high (Bukvic and Owen 2017; Nalau and Handmer 2018; Mayr et al. 2020; Seebauer and Winkler 2020a; Thaler et al. 2020b). Managed retreat adapts and requests to change past spatial planning decisions (as new and more buildings were built in hazard-prone areas) and to react to hazard exposure that was unknown in the past (Schindelegger 2019). Managed retreat foresees the removal of residential and non-residential properties from hazard-prone areas. However, managed retreat highly influences private property rights (Hartmann 2011). Therefore, the permanent movement of individuals is an extreme measure of flood risk management (Mayr et al. 2020; Seebauer and

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Winkler 2020b). However, managed retreat of residential and non-residential buildings has been largely ignored by public administration and communities as for their strong implications of individual livelihoods as well as high costs of relocation (Perry and Lindell 1997; Orlove 2005; Niven and Bardsley 2013; Bukvic 2015a, b; McMichael et al. 2019). Therefore, managed retreat is a rather uncommon adaptive measure to reduce losses from future hazard events as it also causes large negative consequences to individuals and communities (Perry and Lindell 1997; Orlove 2005; McLeman and Smit 2006; Hurlimann and Dolnicar 2011; Bukvic 2015a, 2015b; Mortreux et al. 2018; Miller 2020). A lack of consideration of this policy is also based on the anticipation of low acceptance and public outcry among at-risk residents, who would be required to radically change their individual livelihoods (López Carr and Marter Kenyon 2015; Binder et al. 2019). Nevertheless, discussion on population migration due to natural hazards is not entirely new (Black et al. 2011; Mallick and Vogt 2014). Similar results can be found in bioenergy or hydro-electricity projects or mining-induced managed retreat processes (Delang and Toro 2011; Terminski 2015).

The aim of this paper is to analyze and to understand the social justice implications in flood risk management on the example of managed retreat. In particular, the paper focuses on existing management approaches to reach a more cohesive managed retreat policy (Rauter et al. 2019; Thaler et al. 2020a). A crucial question is how to implement managed retreat and how to design the instruments to implement managed retreat. A key challenge reflects the social justice implications of managed retreat, especially if private land owners in hazard-prone areas get compensated or not to remove their house. These open questions about whether we should compensate people, how should be the type of compensation, the level of compensation, or should people care about themselves as the cost-benefit analysis (CBA) shows a negative or low ratio with the results that the government does not provide any flood protection schemes, such as dams, for these communities. This paper rather aims to understand how both countries deal with the question of social justice in managed retreat, how they differ, and what may work in the realization of social equity based on this case study assessment. This paper focus on the research question:

- What is the current level and procedure for compensation between the public administration and the private owner in both selected countries?
- Which philosophical understanding of social justice is applied in the different used instrument of managed retreat in both selected countries?

In the past decades, these two examples have used managed retreat in flood risk management as a possible solution to

response to extreme weather events. In particular, the Austrian government used managed retreat alongside the Danube catchment, where more than 500 buildings were moved since the 1970s (Thaler et al. 2020b). In England, managed retreat was so far mainly used for coastal erosion risk management, especially in rural areas with a low population density (Johnson et al. 2008). However, both countries show two controversial implementation proceedings: a fix and prescribed compensation system in Austria juxtaposed with a policy without or low compensation in England. The paper is structured as follows: the “**Managed retreat in current social justice debate**” section provides an overview of the current debate on managed retreat and question of justice in flood risk management. In the “**Methods**” section, the paper briefly presents the used methodology within this work. The “**Results**” section focuses on the comparison between the compensation scheme and impacts on justice in both selected countries. Finally, the “**Discussions and conclusions**” section presents the discussion and conclusion and policy implications of public compensation to managed retreat.

## Managed retreat in current social justice debate

Social justice has become recently a more important aspect and concern in flood risk management policy, current research attention on the distributional and procedural aspects of flood risk management. The ongoing literature often focuses on the question who is living in the hazard prone areas, who bears the costs of structural and non-structural measures used in flood risk management, or who gets involved in the decision-making process (Thaler and Hartmann 2016; Alexander et al. 2018; Collins et al. 2018; Kaufmann et al. 2018; Thaler et al. 2018; Ajibade 2019). In the literature, we can distinguish between different philosophical schools how social justice can be understood and used within the research and explanation. Within this paper, I selected four main social justice philosophy, mainly (1) utilitarian, (2) egalitarian, (3) libertarian, and (4) prioritarian. Table 1 summarizes the most popular research directions, which tries to answer the question what is social justice and how policy should be organized and framed for the communities and individuals.

Most classical philosophical understanding and used policy framework include the utilitarian approach (Johnson et al. 2007; Thaler and Hartmann 2016; Kaufmann et al. 2018). The utilitarian tradition understands and views justice based on the maximization of “happiness” or greatest benefits to the society. Each policy should ensure the greatest wealth to the individuals of each country (Mill 2010). However, the utilitarian approach does not include the question of how risks and benefits are distributed (Thaler et al. 2020a). Within the utilitarian approach, managed retreat would mainly be organized

**Table 1** Concepts of social justice in managed retreat

Concepts of social justice	Short description
Utilitarian	Managed retreat policy orients to the highest benefit (or greatest happiness) for the community. The assessment ignores the distribution of costs and benefits within a community. The decision is based on CBA if managed retreat can be implemented.
Egalitarian	Managed retreat should ensure the same possibilities and changes to each member of the community. Vulnerable groups should be supported by public administration. The aim is to provide the same managed retreat policy, include high-income community members reach lower compensation payments compared to low-income households.
Libertarian	Main focus lies on the individualistic role in managed retreat. The state should not influence the use and the implementation of managed retreat; similar aspect reflects the question of compensation as government should not provide them.
Prioritarian	Managed retreat policy oriented to the question how to support the most vulnerable members within the community. Managed retreat needs to compensate the unequal distribution of costs and benefits within the community.

Adapted from: Thaler et al. (2018); Thaler et al. (2020a, b)

based on CBA. Consequently, the use of CBA would manifest itself social and spatial inequality in the impacts of managed retreat to individuals and communities. Managed retreat programs—based on a utilitarian direction—are at risk of reproducing existing inequalities, such as the welfare gap between high- and low-income households, or the urban-rural divide when facing population decline and demographic ageing. CBA usually disproportionately affects low-income or minority communities as, for these communities, the outcome of the CBA is negative to get any protection (Siders 2019b). The egalitarian understanding of justice focuses on the question of how benefits and risks are distributed and based on this question how to organize the allocation of resources (financial, personal, information, power) within a community. In particular, an egalitarian direction would make a stronger emphasis on the aspect that ongoing inequalities within a community need to be reduced. The aim is to provide every member of a community the same possibilities to engage in flood risk management (Thaler et al. 2020a). If managed retreat is needed—as last and only possibility as a response to flood hazard—the policy would mainly engage with low-income families within the program. People who are affected by managed retreat are confronted with profound changes in their lives (Perry and Lindell 1997). Affected households and communities must deal with multiple long-term impacts on their livelihoods and socio-economic development, and the question arises as how to account for the multiple factors that contribute to individual vulnerability and coping ability. Household and community level coping processes in response to managed retreat highly depend on the individual circumstances and their individual vulnerability (Cutter et al. 2003; Thaler et al. 2018). Therefore, managed retreat often restricts socially vulnerable populations in their ability to respond and more often than not lacks access to critical resources before, during, and after the relocation process (Morrow 1999; Cutter

et al. 2003). The key focus would lie on the aspect how to support vulnerable groups with different resources based on their individual need. The third direction, libertarian understanding of justice, would follow a different perspective. Here, the main understanding or most radical perspective is that individuals should take care of themselves. The role of the public administration within the managed retreat process would be ignorable. Private house owners need to organize the relocation process by them without getting any financial support (or any other support) as they are solely responsible to knowing and deciding to live in a hazard-prone area (Thaler and Hartmann 2016; Thaler et al. 2020a). The last direction includes the prioritarian understanding of justice (Rawls 2005). Generally, prioritarian perspective on justice would—similar to egalitarian approach—focus on the most vulnerable members of the community. Also, here the policy direction and support should be mainly on the households who struggle with managed retreat. A prioritarian understanding of justice foresees a managed retreat policy to low-income householders if they benefit from the policy, such as through financial compensation. The relocation process would not only focus on the relocation to the “safe” side outside of the hazard-prone area. The type and level of compensation (and support) would be needed to organize around the affected parties and their individual need.

## Methods

This paper assesses how managed retreat, in particular the type and level of compensation, influences the social justice implications. The paper used an international comparison approach to evaluate and reflect different used instruments in managed retreat to provide a much deeper understanding of managed retreat to social justice (Sartori 1991; Chappell 2010;

Thaler et al. 2020a). Both countries were chosen with the aim of analyzing diverse political agenda settings in managed retreat, mainly different scheme in Austria (up to 80% by the government) in contrast to the scheme in England (usually no compensation from the government, Johnson et al. 2008; Thaler et al. 2020b). The countries also represent a diverse set of institutional, socio-economic, and cultural characteristics in terms of flood risk management policy and question of sharing responsibilities between national, regional, and local authorities. The comparison was based on the following four criteria: (1) justifications to implement managed retreat as an option; (2) who were relocated in terms of socio-economic background; (3) land use regulations in both countries; and (4) design of compensation for the implementation of managed retreat. The comparison focuses on the assessment of different legal and policy frameworks in both selected countries. The assessment includes (a) English- and German-speaking literature review based by a Web of Science search with the terms “planned relocation,” “managed retreat,” “managed realignment,” “roll-back policy,” “Umsiedlung,” or “Absiedlung” limit to the selected countries; (b) review of current legislations dealing with managed retreat in both countries; (c) articles from local and regional newspapers: Hull & East Riding News – Hull Daily Mail between 2005 (first planning document for managed retreat in East Riding) and 2015 (the publication date of the flood resilience community pathfinder final evaluation report), Eastern Daily Press for the example of Scratby between 2009 (start of the pathfinder project) and 2015, and Oberösterreichische Nachrichten between 2002 (large relocation process in Machland Nord) and 2015 (second large relocation process in Eferdinger Basin); and (d) policy documents at national, regional, and local level (see list of selected documents in ESM 1). The assessment of the legal and policy documents allows us to evaluate and to assess the compensation schemes in Austria and England. In particular, the documents allow us to understand the formalize rules in managed retreat.

## Results

### General managed retreat options in the selected study sites

Since the 1970s, different levels of the Austrian government (national, regional, and local authorities) have organized a managed retreat process for private households and businesses along the Danube River (in lower Austria in the 1970s and upper Austria following the 2002 and 2013 flood events), moving more than 500 households. The scheme has been entirely voluntary, with the authorities offering to compensate the relocated owners of each property at its estimated market value. The managed retreat policy in Austria is rarely implemented and used as a flood

or coastal erosion risk management strategy. A key reason for the low political support to use managed retreat is the public resistance against this policy by individuals and businesses as managed retreat would cause a drastic change of individual livelihoods (Thaler et al. 2020b).

The English managed retreat policy mainly focuses on coastal areas of the country and has implemented roll-back policies since the 1970s and 1980s in which single houses were relocated (Johnson et al. 2008). Similar to the Austrian example, the English managed retreat policy (or roll-back policy) is only rarely used with the same justifications. The decision to use managed retreat is largely integrated with the integrated coastal zone management plan. The most prominent example has been the roll-back policy in East Riding, Yorkshire, which was implemented from the end of the twentieth to the beginning of the twenty-first century (Johnson et al. 2008; OECD 2019). Roll-back policies have been seen as potential solutions to the challenges of coastal erosion as well as to rising seas. In addition, various coastal areas throughout the country have serious economic and demographic problems. Large areas are typically rural, densely populated, and have low economic activities, which usually create a lower benefit-cost ratio with the implications that the public administration does not provide any structural protection schemes for the community.

### Implementation of managed retreat in both countries

The two countries have slightly different explanations for justification and ways they implemented managed retreat. The Austrian decision-making process was not based on a CBA. The managed retreat policy has been mainly based on a technical feasibility description. The designed area has been based on hydrological modeling showing that technical options cannot be implemented or are too expensive. In addition, the Austrian flood risk management policy should avoid transferring the risk of structural flood risk management systems to their neighborhood communities (Republic of Austria 1959), which was the case for managed retreat examples in the Danube area. In the 1970s, the designated area generally included areas that were regularly flooded by the Danube, as the communities had no hazard maps. Later, the managed retreat policy was implemented in areas within the 1:100 inundation map.

The English managed retreat has been implemented based on the integrated coastal zone management plan. The decision-making process was mainly based on the CBA as well as on how the risk might change in the future based on sea level rise (East Riding 2005, a, b; Defra 2012). The area shows large erosion activities, with certain areas losing more than 1.5 to 2.5 m per year. More than 148 houses and one hotel are at risk during the next 100 years. Within the introduction of the Flood Resilience Community Pathfinder scheme in 2012, Defra launched, in addition to the roll-back

policy in East Riding, four larger roll-back examples that were slated for implementation between 2012 and 2015 and were mainly in North Norfolk, Scarborough, Scratby, and Waveney (Defra 2012, 2015a). The roll-back policy was already implemented in East Riding, North Norfolk, Scarborough, and Waveney. As a result, more than 43 properties were relocated in East Riding, more than 9 properties were relocated in North Norfolk, 15 properties were relocated in Scarborough, and one property was relocated in Waveney (Defra 2015b).

### Compensation level of relocated properties

The Austrian managed policy predicted compensation of 80% of the time value of the building and 80% of the estimated demolition costs (AdNÖLreg 1999; Amt der Oberösterreichischen Landesregierung 2017). The assessment of the building value was conducted by an external expert and evaluated by the Federal Ministry of Finance. In addition, the owner of the plot was not compensated, and these plots were still owned by previous private land owners under different land use classifications (reclassification from residential to grassland). The private landowner had to contribute 20% of the relocation costs, such as the estimated demolition costs (Amt der Oberösterreichischen Landesregierung 2017). Furthermore, the costs for buying a new plot as well as a new house or apartment were contributed by the private landowner. Nevertheless, since the 1990s, the managed retreat policies in Upper Austria involved special “new plots” that were designated by the local authorities for the potential relocated house owners and that had limited maximum prices. This special price was much lower than the available market price, in some cases by approximately 50% (Gemeinde Alkoven 2014). After a positive agreement between the house owner and public administration, the house owner received their first payment rate (64% of the value). The second rate was paid after the final demolition and re-zoning of the plot (Land Oberösterreich 2015). This strategy was mainly implemented with the last managed retreat action in 2013.

The English managed retreat policy did not include a clear, standardized approach for compensating private land owners. Before the Flood Resilience Community Pathfinder scheme, the government did not predict any compensation strategy in the East Riding example (Johnson et al. 2008). The Pathfinder projects allowed the communities to apply for national financial support to compensate private land owners. However, the level and regulation of compensation was different among the selected examples. In addition, only three out of the five communities under the Pathfinder project provided compensation schemes (see ESM 2). The level of compensation included more in-depth criteria in some Pathfinder projects, including the level of risk (in the case of East Riding) or the year of building (in terms of the Waveney example). Waveney differentiated the level of compensation if the building was built or

purchased before the introduction of the Shoreline Management Plan of 1998. East Riding classified the buildings into three levels of risk. However, only buildings in the imminent risk (level 1) reached a wide range of compensation, such as the possibility of requesting small hardship payments or the payment of agent fees. For other buildings with a lower risk levels, the offer of buy-back and lease-back options were mainly provided (Defra 2015b).

Table 2 provides an overview of the results and highlights of both selected countries.

### Discussions and conclusions

The Austrian managed retreat policy was based on a more technical purpose. In the 1970s, the decision-making process used a much more ad hoc strategy to provide private house owners with a managed retreat offer. So far, the Austrian policy has not used or included a CBA—which would follow a utilitarian approach—in the decision process, which would strongly favor higher income community members in a selection process (Siders 2019b; Emrich et al. 2020). The decision-making process provides people in high-risk areas with compensation instead of providing structural measures. However,

**Table 2** Comparison between Austrian and English managed retreat policy

	Austria	England
Justification of managed retreat	<ul style="list-style-type: none"> <li>• Political decision</li> <li>• Key justification was the lack of the feasibility of technical solutions at the designed areas</li> </ul>	<ul style="list-style-type: none"> <li>• CBA showed no justification to implement structural measures</li> </ul>
Affected house-holders	<ul style="list-style-type: none"> <li>• Different socio-economic background; social vulnerability played no role in the decision process</li> </ul>	<ul style="list-style-type: none"> <li>• Rural communities with a higher social vulnerability</li> </ul>
Land use regulation	<ul style="list-style-type: none"> <li>• Householder still own the plot</li> <li>• Re-zoning of the plot (from residential to grassland)</li> <li>• Designed special land use zones for relocated settlements</li> </ul>	<ul style="list-style-type: none"> <li>• No designed special land use zones for relocated settlements</li> <li>• Restriction of future use of the owned land/or loss of planning permission and legal agreements</li> </ul>
Design of compensation	<ul style="list-style-type: none"> <li>• 80% of the time value of the building</li> <li>• 80% of the estimated demolition costs</li> </ul>	<ul style="list-style-type: none"> <li>• Generally no compensation payments were provided by the government</li> <li>• Under the pathfinder project compensation payments were provided by depends on the area (see ESM 2)</li> </ul>

the level of compensation is uniform in utilitarian approach decisions, where the level of compensation is based on the property value and overlooks ethical dilemmas, such as vulnerable groups that need further assistance by public administration (Nussbaum 2000; Binder et al. 2015; Siders 2019b; Thaler et al. 2020b). Consequently, this strategy has strong social justice implications, as vulnerable groups often live in less highly valued assets (Emrich et al. 2020; Thaler and Fuchs 2020). Further compensation reflects the price setting for private homeowners to buy a new property to build a new home, but only in specifically designated areas by local authorities. People who refused this offer had to organize the purchase of a new property at the market-price level on their own. This route is more likely to be possible for people with higher incomes and greater financial resources. Overall, the Austrian government provided no special support for the most vulnerable groups.

The English managed retreat policy follows a strong utilitarian approach, where the decision to provide structural protection schemes to reduce the risk of residential or nonresidential properties is based on a CBA. If the CBA provides a low or even negative value, the decision by public administration foresaw the use of managed retreat instead of the implementation of structural protection schemes. In particular, the use of CBA reinforces and may also increase social inequalities within the country, as coastal and rural areas often show lower CBA values than urban areas (Gotham 2014; Emrich et al. 2020; Thaler and Fuchs 2020). Furthermore, coastal areas (especially in England) show higher social vulnerability challenges and deprived communities, which might even enforce the problem of inequality (Walker et al. 2006; Walker and Burningham 2011; Collins et al. 2018). In the past, the people were left alone to deal with ongoing and future hazards. The government did not provide any support to them and allowed considerable autonomy (Johnson et al. 2008; Thaler and Hartmann 2016). An exemption, after the Flood Resilience Community Pathfinder scheme in 2012, the national government launched the opportunity to compensate private homeowners in case of managed retreat offers. However, the level of compensation varied considerably between the used examples and was often based on the level of risk and the availability of risk information. Here, again, the compensation showed some liberal approaches, as the hazard information should meet the requirements to be excluded from the compensation scheme (Thaler et al. 2018).

The question remains as to how we can reduce social inequalities in post disaster policy, especially in line with managed retreat policies. Managed retreat programs include a wide range of negative impacts on individuals and communities. If the implemented managed retreat policy ensures and (maybe even) increases social inequality within a country, there is a need to rethink and reconsider the instrument. However, the challenge is that doing nothing in hazard-

prone areas might also increase social inequalities, as socially vulnerable households will be more negatively affected by future events for various reasons (Gotham 2014; Emrich et al. 2020; Thaler and Fuchs 2020). Therefore, it is necessary to rethink and reconsider the current managed retreat policy to target the most vulnerable groups to include their needs and interests within the policy design, not only by providing financial compensation. In summary, both examples of managed retreat implementation failed to reduce social inequality. Either instruments concentrated relatively strong utilitarian or liberal social justice perspectives rather than focusing on the most vulnerable groups in the selected area.

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## Declarations

**Competing interests** The authors declare no competing interests.

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