

Strategic Use of Instruments of Land Policy for Mobilising Private Land for Flood Risk Management

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Private land for flood risk management

Floods are among the most frequent and destructive natural hazards worldwide (CRED 2020). In Europe, as in many other parts of the world, the number of severe inland floods has been increasing since the 1980s (Blöschl et al 2020). In combination with urban development and the accumulation of damage potential in floodplains these shifts in the extremes are likely to be the major cost drivers for the adaptation of infrastructure and thus pose the biggest challenge for the adjustment to floods (UNDRR 2019; OECD 2016).

Traditional defence-oriented approaches, which rely on linear flood defences (i.e. embankments and levees) to protect up to defined flood levels (e.g. 1-in-100 year events), are no longer viable to cope with the changing levels of flood risk (Merz et al. 2010; Alfieri et al. 2016). For one, the expected climate effects on flood hazards increase the likelihood of overload or failure of flood protection infrastructure. This calls for policy efforts to attenuate rather than accelerate flood discharge where possible and to design “robust” flood protection systems that perform well under different future climates (Wilby and Dessai 2010; Mens et al. 2011). Secondly, flood defences protect vulnerable areas and provide “flood safe” areas, which are highly attractive for development. This “levee effect” or “safe development paradox” demands approaches that secure corridors for controlled flood runoff in extreme events and that mitigate the further accumulation of damage potential in protected areas (Tobin 1995; Collentour et al. 2014).

Against this background land is becoming an increasingly critical factor in flood risk management. While there is a general consensus to “accommodate water” on land for (temporary) flood storage or flood runoff to reduce downstream flood risk (Wesselink 2007; Johnson and Priest 2008), the provision of the necessary land for floods is hampered by the lack of availability and accessibility of such land. Retaining or storing flood water on open land is found to interfere with existing options and rights of land use, often implying a reduction in crop yields and/or a depreciation in land value (Löschner et al. 2019, EEA 2016). Similarly, the need to mitigate flood damage in protected areas is widely recognised, but there is a reluctance to further regulate land development and impose building requirements (Hartmann and Needham 2016). Fundamentally, policy efforts to deliver these much-needed changes in flood risk management are overridden by a conflict of interest between the public aim (to use land for managing flooding) and the private interest (to limit infringements in private property rights and maintain opportunities for land development) (Petrow et al. 2006; Kenyon et al. 2008).

The focus on private land of this special issue points at a “policy delivery gap” (Moss 2008) and the instruments by which to overcome it. Whereas the technical and hydrological functions of land in flood risk management are relatively well known, there remain considerable gaps in the understanding of how to mobilise the required land resources and overcome, respectively prevent, flood-related conflicts in land use (Edelenbos et al. 2013; Morris et al. 2016). As most studies focus on case and context specific solutions, gaining a more comprehensive and generic understanding of the different options and mechanisms of leveraging land for floods is an important task for research and policy practice alike. This cross-disciplinary edited collection brings together research from the natural, technical, legal and social sciences to provide an

encompassing instrumental perspective of mobilising land in the context of flood risk management. The core aim of this volume is to explore solutions to this pertinent issue in the broadening policy paradigm.

Strategies of land policy

Together the assembled contributions present new empirical research from international contexts as well as theoretical reflections concerning strategic use of instruments of land policy.

Land use policy consists of public interventions in the allocation and distribution of land to pursue planning goals (Needham et al. 2018). These interventions aim at modifying “the behaviour of social groups presumed to be at the root of, or able to solve, the collective problem to be resolved (target groups) in the interest of the social groups who suffer the negative effects of the problem in question (final beneficiaries)” (Knoepfel, 2007, p. 24) with public policy instruments. Instruments are “means used to motivate those affected (particularly target groups) to comply with the policy provisions” (Knoepfel, 2007, pp. 156–157).

Though sometimes there are legal or practical limitations on the use of certain instruments to address a specific issue, the choice between these instruments may ultimately be determined within an existing policy framework or resolved as an administrative-technical question (Gerber et al. 2018), however instruments of land policy may also be activated deliberately by public authorities. In this respect, strategies of land use policy can be very specific combinations of instruments “carefully thought through by public authorities in order to impose themselves in front of other private (or public) interests and reach public planning objectives” (Gerber et al., 2018, p. 9). Once a strategy of land use policy has been conceived “the way these instruments are activated to achieve a certain policy goal” (Shahab et al. 2020, p. 2) can be analysed as a means to achieve this goal.

Policy interventions in general may be categorised as regulatory instruments, market-based instruments, and voluntary schemes oftentimes based on collaborative schemes or mere information (Ayres & Braithwaite, 1995; Hartmann & Needham, 2016; Shahab & Allam, 2020). This special issue focuses primarily on public policy instruments that interfere in one way or another in property rights. These therefore fall largely under the category of regulatory instruments, although some of the instruments addressed by the authors may also imply approaches which include market-based schemes or collaboration in schemes. Public authorities can pursue four types of regulatory instruments which can be distinguished by the way they intervene in property rights – in this case of land for flood risk management: (1) instruments that regulate land uses using public policy without impacting property rights (for example taxation, incentives etc.); (2) instruments using public policy that impact the scope and the content of use or disposal rights (such as land consolidation, land use planning); (3) instruments that redefine property rights and that impact the scope and the content of use or disposal rights (like e.g. pre-emption rights); (4) instruments that redistribute property rights (such as expropriation) (Hengstermann & Hartmann, 2018). The contributions in this special issue discuss which of, and how, these instruments are used in practice to pursue flood risk management.

Overview of contributions

The contributions in this special issue offer a diversity of cases highlighting the significance and need for mobilising private land for flood risk management across a wide geographic scope. Although contextual differences are significant to mention, the contributions provide evidence of some common, and transferrable, lessons to inform policy and practice at different scales and different levels. Firstly, some of the contributions explore the issue at a strategic policy level, to better understand policy choices and their implications.

Verweij et al. (2021) provides an evaluation of policy instruments intending to integrate water and flood risk management with spatial planning. Using the context of the Dutch *Room for the River Program*, and an analysis of nineteen implemented projects, they identified three combinations of policy instruments aiming to improve spatial quality; an integrated contract mix (mainly driven by private parties), a project management mix (where governments maintain a traditional role leading the project), and an outside-government mix (governments facilitate action, but outside of their scope). The findings demonstrate the importance of local context and legacy and that no single approach and combination of policy instruments is sufficient to provide for successful implementation. They also highlight the changing and varying position of governments in flood risk management and the inclusion of additional parties in integrating spatial planning and flood risk management.

Glavan et al. (2020) in their investigation of flood risk management in the Lower Savinja Valley, Slovenia, focus on the implications of storing flood water on agricultural land. The authors perform an economic evaluation of the impact on agricultural output to quantify the consequences of mobilising private agricultural land for a collective flood risk intervention and emphasise the need to adopt mitigation measures to limit this impact. Including (and quantifying) these impacts at an early stage in the decision-making process, as well as including key stakeholders from the agro-environment (and other) sectors, is essential to ensure that strategic policy decisions are not taken at the expense of private agricultural land. Indeed, in this case, a civil farmers-organised initiative ensured that agricultural elements were included in the planned flood risk management plan.

Whilst the previous examples provide learning about higher-level and more strategic-level plans and their implementations, other contributions to this special issue focussed on specific instruments and their activities. We need to continue to ask questions about which instruments are best placed to enable flood risk management in which contexts? And which conditions are needed for implementation to be successful? These cases do not provide lessons to be directly transplanted into other contexts, but rather help to reflect upon the demands on one's own system by providing an outside view. Although there will always be different legal and institutional contexts, they do help to better understand wider lessons for the design and implementation of instruments.

The issue of mobilising upstream, rural, private land for the benefit of downstream, urban areas is a common dilemma in flood risk management; raising tensions between private aims and public interests. Sheehan et al. (2021) explore these issues in the context of Australia and have explored the use of three different types of instruments to identify approaches to mobilising private land for flood risk management; compulsory acquisition, Tradeable Development Rights, and inverse leaseholds. Importantly, they have identified the disparity between the approaches in considering the value of land. For upstream, rural areas, the economic utility of land is often the primary determinant, whilst downstream for urban areas the value of land is principally tied to capital growth potential. This has a significant influence on the most appropriate and effective instrument. The authors conclude that the use of inverse leaseholds (where a private landowner transfers rights to the government and then leases back the right to use the land) are more appropriate for upstream, non-urban areas, rather than Tradeable Development Rights or compulsory acquisition which are more suited to urban, downstream areas.

The contribution by Dyca et al. (2020) also focuses heavily on one of these latter instruments; Tradeable Development Rights in the context of blue/green infrastructure. Blue-green infrastructure utilises approaches which employ or mimic natural processes. Although these more innovative approaches have been utilised for some time, mainstreaming and funding of them remains limited particularly because they require contributions of public and private land and coordination between areas. This contribution provides a comprehensive analysis of a variety of Land Value Capture instruments (e.g. land betterment levies, property taxes, cooperative land banking, land sharing) for facilitating blue/green infrastructure initiatives. Evidence suggests that Tradeable Development Rights (where property rights can be voluntarily or compulsorily transferred from areas where development is not favoured to other areas where development is planned) have provided the most success to date in enabling planning authorities to realise, and fund, their joint environmental and flood management agendas. Despite this, several limitations remain including distributive-justice implications, difficulties in valuation and high transaction costs, which may need to be overcome before the more widespread adoption of these approaches takes place.

Formal strategic planning instruments can provide dual opportunities to secure areas for flood protection or retention in addition to regulating development and ensuring flood adaptation. Thaler et al. (2020) explore the interrelations between spatial planning and the realisation of these two goals in Austria through studying the adoption of two instruments. In two examples presented by the authors, instruments were implemented differently. One was more top-down at the regional level with legally binding land use regulation and land mobilisation likely to occur by restrictive zoning, while the second was more bottom-up and led by the local authorities with non-formalised negotiations and zoning and land mobilisation likely occurring following these negotiations. However, despite their differences the implementation of both instruments exemplifies the importance of stakeholder involvement and integration into the planning process which led to a high level of acceptance and significance amongst regional and local authorities. Key conditions include: the close cooperation of water management and spatial planning authorities, concessions made to local authorities and agricultural landowners (for one instrument) and to the use of a continuous communication process using implementation. The cases serve to highlight both the potential opportunities facilitated by these

instruments and the shift from more regulatory policy towards more strategic spatial development approaches.

Richardson (2021) highlights an example of an instrument which aims to mobilise both state and private individuals to adopt risk reduction measures, but also provides an example of where the multi-level implementation is impacting its effectiveness. The longstanding US National Flood Insurance Program (NFIP) incentivises action via the receipt of subsidised flood insurance but requires the adoption and enforcement of floodplain management regulations by local governments. This paper analyses the effectiveness of this instrument in areas of West Virginia, Pennsylvania and Vermont. Findings highlight the complexity of the implementation of the NFIP through local governments having to comply and meet minimum requirements for zoning, building codes and subdivision regulations introduced and delegated from the State level. In particular in West Virginia, many rural local authorities lack the capacity to implement the regulations and struggle to reconcile the multiple necessary requirements with the local situation. However, the examples from Pennsylvania and Vermont highlight potential resolutions to this issue whereby specific authority is delegated to local authorities to introduce and implement local ordinances which comply with NFIP requirements, rather than having to adopt the complex State-level regulations. In general, the challenge in meeting the minimum NFIP requirements threatens the effectiveness of program implementation with key lessons including the need for improved enabling authority, increased financial support and better coordination between federal, state, and local governments.

The final group of contributions within the special issue focuses on empirical considerations at the policy implementation level and the challenges that result. The conflict that occurs when privately-owned land utilised by communities is used for temporary flood storage is a common issue affecting many countries. Du et al. (2021) explore this issue in the context of flood detention zones in the Huaihe River in China and explores the perspectives of local stakeholders. Conflicts in this example have been exacerbated by population growth and settlement development in areas designated for flood retention, making the use of land for flood storage difficult and the creation of a policy delivery gap. This has necessitated the consideration of three approaches to resolving the problem; widening the rivers to increase capacity, promoting flood adaptive farming (thereby ensuring that the local population live better with flood risk) and widespread relocation of over 400,000 people. Findings indicate that awareness of these proposed solutions is low as is the adoption of any flood adaptive measures. Additionally, most residents do not favour relocation and see it as economically unattractive with high immediate costs and few benefits. The acceptance and feasibility of the policy could be enhanced through better communication and inclusion of the community in decision making.

An example of how public and private legal instruments work in practice is illustrated by Albrecht and Hartmann (2021) in their investigation of new instruments of land acquisition for flood retention in Germany; namely pre-emption rights and regulations to ease expropriation. Through empirical investigation of the reality of mobilising private land, this contribution highlights the differing issues for property rights present when implementing different types of retention measures, as the demands on land use and ownership vary. Whilst the research identifies a wide range of available instruments, only a limited number of these are actually implemented – an illustration of caution and conservatism in Germany's flood risk management. Despite having great potential to mobilise private land for natural flood risk management findings indicate that these new instruments are often overlooked by practitioners in favour of more established instruments where the effectiveness is more widely acknowledged. So it is not always lacking instruments at the disposal of authorities that hinders implementation of nature-based flood risk management.

Finally, Nikolic (2021) provides an evaluation of the effectiveness of Serbian legal regulations for flood risk management and in particular for the delivery of private land for nature-based solutions. This example is set in the context of the progress towards working to harmonise Serbian Water Law with EU Directives. Both pre-exemption rights and expropriation were analysed as potential options for mobilising private land, and it was concluded that they are not suitable for use as standard, regular instruments for acquiring the larger land areas required for nature-based solutions. Pre-exemption rights are not yet demonstrated to work in practice and expropriation was considered to be too intensive and expensive to be used on a regular basis. Currently, Serbian Water Law does not make a provision for mobilising private land. A potential legal solution was identified (and justified via the *Theory of Social Function on Property and the Constitution*) which could prescribe flood retention on private land as a mandatory measure in Serbia, if a superior public and general interest is demonstrated. This highlights an example of a legal approach which might be utilised to prioritise

overall public interest over private ownership rights; but at the moment is only a theoretical and may equally be considered to be a more extreme measure to implement. More commonly, there may be the need to rely on other solutions such as voluntary agreements, perhaps using economic and ecological incentives, to facilitate the implementation of nature-based solutions.

Conclusion

This issue does not prescribe or recommend a particular instrument for mobilizing private land for flood risk management. The papers in this issue do clearly demonstrate that yes, instruments are important but even more important is to recognize the context of the problem and the willingness of stakeholders to activate certain instruments in a strategy. The same land management policy may be successful in one environment but less (or not at all) successful when applied in another environment. Each of the papers provides an opportunity for the reader to learn not only what types of instruments and strategies are available but also to analyse which of them might be a more appropriate alternative for a given situation.

Tradable Development Rights could be an effective way to make private land available for flood mitigation measures but what legal institutions are needed to make this possible? Whether an institutional framework is already in place which will support this instrument needs to be studied to determine whether this alternative is possible. This is also true for more regulatory planning approaches that rely on expropriation or pre-emption to make land available. Does the legal system support these and if the answer is yes, does one of these have a more acceptable outcome for stakeholders?

In all the papers in this special issue stakeholders have a central role. Property rights is another common denominator. While the papers do not always directly address the property rights of stakeholders it is implicit in their analysis of the instruments. In a more centralized context, some property rights with respect to land use may be held by one stakeholder representing society, the state. In another context property rights may have evolved which establish a more complete form of land use held by private owners. Each of these contexts may make one instrument easier to implement and another instrument more difficult. What makes an instrument easy or difficult will depend on acceptance by stakeholders, this is the strategic choice to be made when more than one alternative is available.

The contributions in the special issue also indicate – in different forms – that it is not (always) the solution to call for new instruments if land is needed for a specific purpose. The contributions on Serbia, Germany and also Australia show that sometimes instruments are available, but they need to be activated. Land management for flood risk management is thus not solely a question of instruments and institutions, these frame the conditions, but really is an issue of public authorities and other stakeholders making strategic choices.

To make such strategic choices decision-makers need information. The papers in this special issue do not provide all the information needed but they do provide an indication of what type of information can be useful. The instruments for mobilising private land presented here are seeds, some of which have been planted (implemented) and the results analysed. What made this one grow better than the same one? What in the context supported growth (acceptance)? The papers are meant to inspire practitioners and lead researchers into further interesting questions to pursue. Each of the contributions does this, now it is up to the reader to take the next steps.

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