

Chapter 24

Conclusion



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Private land matters in FRM. In particular, private land is closely associated with NBS in FRM—*nature-based flood risk management*. Nature-based solutions are currently receiving a large degree of attention in policy, academia and slowly in practice (see introduction). These measures need more land, and this land is often privately owned. However, experience of implementing NBS in FRM remains scarce; this book showcases much called for empirical practice examples of nature-based FRM on private land.

The examples from different parts of Europe illustrate the wide variety of NBS that are currently available, but they also show the variety of private land issues that can arise on various scales. Looking at the examples shows us that privately owned land in FRM does not necessarily mean that the land is legally owned by an individual person; also public authorities can be owners under a private law regime. Within this volume, when private land is referred to, the term land refers to that which falls under private law. Private law regulates interactions of legal persons (on land)—opposed to public law, that applies to the relation between public authorities and private legal persons (Needham et al. 2018). This means, individuals, regional

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and local self-administrative units and national/federal states might all serve in the role of landowners pursuing different interests. So, ultimately the book addresses numerous challenges to implementing NBS with the focus on different ownership and planning structures, scales and contexts across Europe.

It becomes evident from this volume, with commentary insights from different disciplinary perspectives, that more land is needed for the implementation of such measures. This raises implications for multidisciplinary research, transdisciplinary knowledge coordination and more intensive stakeholder engagement. Fragmented knowledge and practice domains characterized by a wide range of disciplines (in land-use planning, hydrology, property rights, economics, sociology, ecology, landscape planning, policy science to name a few) are required to not only plan for technically viable approaches, but also to gain social consensus to provide the access to the necessary privately owned land. How such land is acquired may also have implications in long-term cooperation between stakeholders for the sustainable maintenance and further adoption of NBS. Land access and cooperation necessitates relationships between the various concerned stakeholders. It is revealed how the stakeholder interrelationships are important. These can be driven or frustrated by formal policy, legal and economic instruments and by levels and types of knowledge and experience. In addition, informal activities to engage landowners and related decision-makers appear to influence and play an important role in implementation as initially these parties have little or no experience with implementing nature-based FRM on private land.

The examples presented in the book draw mainly on experiences across North-West and Central Europe addressing differing contextual and implementation approaches within a range of topographies and scales. This volume includes examples of nature-based FRM from Austria, Belgium, Czech Republic, Germany, Netherlands and Poland. Scales vary from small and local retention measures with narrow ownership structures (see for example the Czech case with only one landowner involved) up to the catchment level, where planning and wider stakeholder engagement challenges implementation (see the cases from Austria or Germany). All the cases express specific local complexities and are highly contextual. However, broad questions can be identified that cut across the cases supported by the reflections of the expert commentators on each case. The selection of cases was based on the idea of covering a huge bandwidth of NBS in different contexts (without eliminating these contexts). General conclusions from the different disciplines indicate that some of the issues are cross-cutting and more related to disciplinary rather than country-specific issues.

So what are the broad cross-cutting issues that have been identified? Well, namely how ownership matters in nature-based FRM, how processes for implementing such measures need to be facilitated, the aspects of time and scale, but most importantly the communication across disciplines.

Ownership of Land Matters

The examples illustrate that the amount of additional land needed for FRM is substantial when using NBS. Implementation requires engaging with and gaining the support of the landowners. The cases prove that nature-based FRM is land-intensive and that the legal aspects of the land ownership (i.e., full property rights, tenure, and other sticks in a bundle of rights), the number and type of owners (i.e., public authorities or private persons) matter for successful implementation. The reconciliation of public and private interests supported with the appropriate planning tools and funding strategies is crucial—as the Belgian case illustrates particularly, but also Mr. Pitek’s land.

In cases where public authorities or the state are owners of the land, as in the small retention programs in the Polish forests, implementation and possible up-scaling tends to be smoother. As the planning and funding authority overlaps with the land ownership. But this relies on those public authorities taking the lead and, as in this case, being motivated by wider political or market conditions (see Futter, this volume) or more usually through economic justification in planning to persuade state support (see Macháč, Louda and Löschner, this volume). However, even without the financial support of the state, nature-based FRM is feasible, as the case of Mr. Pitek’s land illustrates. The self-motivated private landowner created retention ponds on his private land (see Slavíková and Raška, this volume). A private landowner challenging public policy by undertaking what “he feels is the right thing” can be considered an unusual case (see Löschner’s commentary this volume) counter to the more common view taken by landowners: “why would I want to pay for that?” (usually in the context of top-down implementation) (see Kapović Solomun, this volume). Both the latter commentaries highlight how important it is that landowners and users, even when highly motivated, feel engaged in the decision making. It is considered vital for the implementation of nature-based FRM that it does not run counter to wider flood management strategy, or, as in the example provided of a Scottish landowner (see Wilkinson, this volume), may run against community practices. The landowner might be self-motivated to pursue NBS but more often requires persuasion and sometimes formal agreements to facilitate their involvement. So, we can conclude from the experiences described in the cases, and reflected upon in their respective commentaries, that land does indeed matter for nature-based FRM, but this does not automatically entail that authorities responsible for FRM do always need to *own* that land.

Facilitating Nature-Based Solutions

Following on from this remark on the ownership of land for nature-based FRM, the question is raised of what we can learn from the examples in terms of facilitating implementation. It is apparent in the chapters that facilitating nature-based FRM

requires the engagement and agreement of landowners for respective changes in land use. Ultimately, it is the individual landowner who needs to accept interventions in land uses or even implement the changes themselves. This asks for strategic planning at a regional and catchment level to take land use change from the landowner's point of view into consideration. The examples from the different countries and at different scales reveal that barriers to implementing measures can stem from uncertainties in hydrological effectiveness and mechanisms of compensation, but that also cultural and social aspects matter (see Thaler, this volume). All these issues need to be addressed as well as landownership. Landowners, and often decision-makers (such as mayors or local authorities), may have little or no experience in the facilitating process for nature-based approaches (van den Brink 2009). Both in the case of turning private agricultural land back into floodplain forests in Germany (see Warner, this volume) and in response to climate adaptation as in the Netherlands case (see Kaufmann, this volume), authors explore the challenges of gaining stakeholder acceptance via a range of engagement practices and financial incentives. Such engagement practices are broader than the traditional cost-benefit arguments and embrace methods of stakeholder involvement and public engagement. This essentially means embedding methods and techniques from different disciplines such as legal governance, planning, social science and economics, in working with landowners and other stakeholders related to the land needed. It is clear from the cases that one set of engagement approaches will not fit all contexts but an appreciation that a variety of methods will need to be employed tailored to the stakeholder context that presents itself. In the introduction, we stated that a key question for implementation is the justification of NBS and for that discussion to take place, empirical evidence is required and a wider understanding of the constraints and enablers beyond just the hydrological impacts is essential.

Time and Scale Matter

So, as indicated earlier, different stakeholder and often related professional disciplines have different perspectives on time and scale and thus regarding the relationship of NBS and their interaction with land. Scale is a crucial aspect of these perspectives but is clearly interrelated with the temporal. The cases reveal differing scalar issues and some of the challenges with such multiple scalar perspectives on nature-based FRM.

There are certainly limitations to the ability of how nature-based FRM methods contribute on their own to the scale of flood risk reduction; their strength lies in the mitigation of more frequent lower inundation events (see Futter, this volume). Even the dyke relocation in the Elbe-Brandenburg case (see Warner and Damm, this volume) is contested (see Staveren, this volume). The same commentator highlights the spatial and temporal characteristics that differentiate fluvial and coastal geographies in terms of water type, ecosystems and seasonality influences, both hydrological and ecological characteristics. At the same time, the Elbe-Brandenburg

case illustrates how the more immediate issue of flood prevention is a stronger aim than nature restoration or loss of land. In other cases, engineering perspectives focus on the underlying argument of understanding and quantifying the reduction in the flood hydrograph and the limitations of smaller-scale nature-based applications. In a nutshell, the more immediate water is needed to be retained in a flood event, the less effective NBS are (see Jüpner, this volume). This hydro-engineering perspective strongly challenges the “common sense” view that every retained raindrop counts and perhaps introduces the temporal aspect of where in the hazard cycle and in relation to the event retention takes place. However, nature-based FRM can also go beyond slowing the flow of flooding (see Kapović Solomun, this volume). Rather than focus just on the FRM aspects, additional longer-term and even perhaps larger-scale ecological and environmental benefits can be brought to the fore but need to be clearly defined. Regulation of droughts and the overall benefit of improving the “buffer capacity” of environmental project areas can be considered (see Jüpner, this volume). Maintaining water quality may be considered but understanding the geology for groundwater recharge is required (see Wilkinson, this volume). It is clear that wider benefits can be multifunctional—including biodiversity, recreation and water management at the local scale but also globally via the hydrological cycle (see Futter, this volume). For those effects to be substantial, scale matters for nature-based FRM but implementation and contribution in that management may be and in some cases is currently driven more by these other benefits. This later point will be returned to later in this chapter.

This volume illustrates that nature-based FRM necessitates multi-disciplinary and cross-disciplinary cooperation not only in the physical and social sciences, but also in the legal and policy/planning arenas. However, institutional and project management may frustrate such interaction. In terms of the scale of the issue interestingly, the observation that, as engineers, they are rarely exposed to the same stakeholder information as landscape and urban planners reveals the potential inequalities in access to information among the project’s professional stakeholders (see Jüpner, this volume). It also becomes apparent that different disciplinary perspectives work to differing time frames. The functionality and impact of NBS can take more time to develop than that of the conventional hard engineering schemes. A sound way to evaluate these specific temporal and scalar challenges of nature-based FRM may currently not be accounted for in contemporary planning instruments in FRM (see Löschner et al. this volume).

The cases do not represent a comprehensive overview of all possible types of measures, but they show the tensions of nature-based FRM at various scales and in different time frames compared to traditional flood protection measures. So, one lesson that can be drawn from these cases is that of the roles of time and scale and their different requirements across the wide range of stakeholders impacts implementation.

Communication Across Disciplines Matter

The majority of authors in this volume continue the call for better empirical information on the impacts and effectiveness of nature-based FRM to support the consensus building and subsequent implementation. There is still a lack of proof regarding the degree of reduction in the hydrograph for varying return periods combined with the additional benefits (restoring urban wetlands) (see Pohl, this volume). Ex-post monitoring of projects for effectiveness would be invaluable to inform such decisions (see Veidemane, this volume). Decisions remain supported by traditional cost-benefit approaches of which one is explored in the urban wetlands in the city of Pilsen in the Czech Republic. The possibly greater contribution comes in terms of social benefits set against costs from NBS is revealed (see Macháč and Louda, this volume). However, Gutman (this volume) highlights a lack of research on the *perceived* effectiveness and legitimacy of the implementation of nature-based FRM. Currently nature-based FRM might be viewed as approaches for the restoration of multiple ecosystem services rather than measures for flood risk mitigation. This perhaps reveals how the political context and institutional agenda can drive different strategies undertaken in European countries. These insights are particularly valuable for engineering and hydrology, fields that still tend to underestimate the role of social constructionism and respective multiple perceptions on actual implementation of measures and their effects. It can be said that disciplines of engineering and hydrology might need to learn to communicate differently with landowners and other “non-expert” persons in FRM. This also became clear in the preparation of the volume, when first drafts of commentaries from engineering or hydrological disciplines were considered rather short and technical by the editors (different disciplinary backgrounds). This communication aspect (not possible for the commentators in isolation) is especially relevant as these disciplines naturally play a key (but shared) role in the justification and implementation of nature-based FRM decided by stakeholders with multiple interests.

Also for economic and legal aspects, it is essential that instruments and effects need to be communicated well. This can be illustrated with the challenges of swapping development rights in the Flemish case where the high transaction resource requirements of this approach meant that the original zoning approaches in place were eventually the preferred option (see Crabbé and Coppens, this volume). This case highlights how economic instruments can be undermined if a gradient does not already exist in the market from supply to demand. Here this does not appear to be the case, and market interventions are proposed (see Kis and Ungvári, this volume) revealing how the contextual challenges for such instruments require as much attention as the measures themselves. However, market intervention may not always be palatable to decision-makers. In this case, there appears to be a lack of willingness to engage with the market rather than government-led initiatives assuming a distinction between public and private property rights that appears unsurmountable (see Sheehan, this volume). Generally, where the legal opportunities are present, the economic policy instruments provide a less disruptive approach in terms of financial, temporal

and sustainable stakeholder relationships (see Thaler, this volume). Still, it is imperative that such instruments are communicated well and in a way that “non-experts” can comprehend the consequences and implications.

The same applies for other disciplines involved and their efforts to communicate. Some disciplines or individuals through the necessity of their work appear to have recognized the benefits of cross-disciplinary communicating more than others (i.e., spatial planning, geography or social science). The need to involve multiple disciplines in nature-based FRM on private land essentially requires an appreciation and use of a commonly understood language or at least a way of interdisciplinary communication that takes other stakeholders’ (i.e., landowners) lack of experience or valuable specific knowledge into account.

The Argument for Putting Land First

Finally, one of the key claims made in this book is that land should be dealt with much earlier in the planning process of nature-based FRM. This conclusion highlights the key aspects accompanied with this approach: dealing with land ownership, the role of the facilitation of processes, how communication across disciplines matters, and the understanding of time and scale. Addressing such challenges, this volume advises fostering a more effective, more efficient, and probably a more legitimate way of implementing nature-based FRM on private land. This was proven by those cases in which conflicts of interests and values are absent or dealt with accordingly: an individual farmer decides upon the use of his land using his own resources, but this is voluntary and produces positive externalities (such as biodiversity enhancement) for others; state forest managers build retention ponds with the use of state funding on state-owned land. One of the lessons to be learned is the early engagement of landowners, planners and the public (whenever public resources are in charge) to reconcile often competing views to lock-in situations.

Probably the most important and most practical conclusion of this volume is that the book makes it abundantly clear that nature-based FRM necessitates that disciplines learn to and do communicate with each other.

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